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Monthly Message

MILITARY ASSISTANCE ADVISORY GROUPS (MAAG)

On a recent visit to Turkey it was our privilege to observe the development of our military assistance along medical lines. Lt. Colonel Samuel B. Caldwell, MC, USA, has been attached to the group in Ankara for the past two years. The Turkish Medical Field Service School was established at Izmir under his guidance. I visited this school two years ago, and again in April 1958 with Dr. B. N. Carter and Brigadier General S. S. Brownton, USAF (MC).

The school is under the command of a general officer of the infantry with medical advisors, and consists of two parts: one for the enlisted men and one for the officers. The initial period of training is basic infantry drill and the school of the soldier. In the medical sections two hospitals have been established with United States equipment, a MASH unit and a field hospital. In an adjacent area officers quarters are being built and nearby is a school of aviation.

The hospital units have been so well trained that earlier in the year they moved to a town in the south of Turkey, which had been completely destroyed by an earthquake, and operated with great efficiency. At the time of our visit they were re-established and fully manned, appeared exactly as do our own units, and were functioning in exactly the same fashion. Both the officers and noncommissioned group were justly proud of their units and of their training systems.

While there, luncheon was being prepared and we found it extremely well cooked, varied, and most palatable. Since beginning this training program 18,000 officers and men have been trained and are completely familiar with the program and their field units. Such training has far reaching effects because, as the personnel return to their homes after their periods of service, they carry their knowledge with them and contribute to the whole medical economy of Turkey.

Frank B. Berry

FRANK B. BERRY, M. D.
Assistant Secretary of Defense
(Health and Medical)

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Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal.*

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UNITED STATES ARMED FORCES MEDICAL JOURNAL

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THE TREATMENT OF ACUTE APPENDICITIS UNDER SUBOPTIMAL CONDITIONS

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FOR the past generation it has been taught that acute appendicitis is a surgical emergency and that "the sun must never set" on a case of appendicitis without operation. Certainly, there must be circumstances where appendectomy should be deferred and the patient transferred urgently because of unavailability of a physician or surgeon, lack of surgical training of the physician assigned, lack of facilities for safe anesthesia, lack of suitable mechanical equipment, or for other reasons not inherent in the patient or his disease. Possibly surgeons have oversold the concept that appendectomy must be accomplished as an emergency at all costs and it may be that we now should stress the matter of judgment as to when, where, and under what circumstances appendectomy should be undertaken. Remote military installations are especially likely to be suboptimally prepared to cope with major operative surgical procedures, and a hospital such as ours is especially apt to see the results of such problems where solution has been attempted under something less than the most favorable circumstances.

Tripler Army Hospital serves not only as a general hospital for the care of duty personnel of the armed services and their dependents, but also serves patients entitled to medical care through the U. S. Coast Guard, Merchant Marine, U. S. Public Health Service, Veterans Administration, Civil Service, and the various foreign consular services. The area served covers a wide area, including many remote military installations and ships

From Tripler U. S. Army Hospital, APO 438, San Francisco, Calif.

at sea. The general surgery service of this hospital recently received a series of patients with acute appendicitis originally seen and treated at one or more of these installations. Operative treatment had been attempted in one group of cases with unfavorable results. In the other group, of equal size, conservative measures of parenteral antibiotic therapy, bed rest, and relief of pain had been used with much less morbidity and fewer complications. It is not the purpose of this paper to criticize treatment given elsewhere, and every sympathy surely is with the physician or corpsman assigned where there are factors limiting the treatment given. However, the comparison between these two case groups is so striking that proper attention to duty requires that they be reported with suitable discussion.

PATHOPHYSIOLOGIC BASIS FOR TREATMENT

Acute appendicitis is secondary to obstruction to the appendical lumen and inasmuch as the appendix is a secreting organ, the obstructed appendix is a closed loop subject to the phenomenon of tension gangrene.[1] The lumen of the normal appendix is little more than a potential space, containing 0.2 ml volume. The appendix secretes at the rate of 2 ml per 24 hours,[2] with a slight early increase in rate for the obstructed organ. Experimental evidence shows that the human appendix will rupture when distended by 5 ml of fluid. Correlation of these bits of information indicates in general that the obstructed appendix will tend to rupture in 48 hours unless the obstruction is overcome by the intraluminal pressure or appendectomy stops the chain of events.

There are several variable factors which make predictions hazardous. For example, there is no way to tell whether or not the obstruction is absolute or whether it can be overcome readily by pressure. Further, there is no way to know the exact duration of the disease process because we depend on the patient's complaint of pain, which is based on his individual threshold. Fortunately, there are other facts which help us. Perforation takes place distal to the point of obstruction and, as has been shown, at perforation about 5 ml of material will be spilled into the peritoneal cavity. The lumen tends to remain obstructed so that there are no successive increments of peritoneal contamination in the usual case. Instead, there is the one 5-ml soiling. This explains why localized peritonitis or abscess formation is seen rather than generalized peritonitis, which is infrequent. These facts indicate that we have about 48 hours before perforation, and soiling is apt to be minimal. It has been fairly generally accepted that appendectomy is a prophylactic procedure to prevent perforation, but if perforation already has occurred, appendectomy may be delayed until after the localized peritonitis has subsided. That this is the usual train of events is well documented.

With the advent of sulfonamides and, later, penicillin and streptomycin, the mortality and morbidity from complications of appendicitis were reduced markedly. As early as 1940, Ravdin, Rhoads, and Lockwood[3] reported excellent results from use of sulfonamides in treatment of appendical peritonitis. In 1945, Ochsner and Johnston[4] reported the use of sulfonamides for localized appendical peritonitis, reserving operation for cases where peritonitis tended to become generalized. They reported that with nasogastric suction, sulfonamides, blood transfusions, and plasma, 75 to 80 per cent of instances of localized appendical peritonitis resolved without surgical drainage. In 1946 Crile[5] reported 50 cases of appendicitis with peritonitis treated with large doses of penicillin with no instance where a subsequent abscess required surgical drainage. Most of these patients were afebrile and taking oral feedings within 72 hours. Pulaski, Artz, and Baker[6] reported uniformly excellent results in localized and spreading appendical peritonitis, using Terramycin (brand of oxytetracycline). From these papers, and others, it is clear that appendical peritonitis usually is not attended by great risk to life if treated by sulfonamides and/or antibiotics. However, to speak against appendectomy was and is medical heresy so that few reports of deliberate omission of operation in early acute appendicitis are seen. Harrison[7] made one such report, documenting 47 cases of early acute appendicitis treated by antibiotics in 1953. The average duration of illness prior to treatment was 18 hours, and treatment consisted of bed rest, nothing by mouth, morphine for relief of pain, and penicillin on the Crile plan of 100,000 units every two hours intravenously for the first 48 hours. Two patients progressed to appendical perforation and abdominal mass formation. Fourteen had peritonitis from appendical perforation when seen, most responding to penicillin alone but a few requiring, in addition, Terramycin intravenously in doses of 500 mg every 12 hours. Nasogastric suction was not used routinely in this series.

Jordan and Hallenbeck,[8] in reporting the current trends in the treatment of appendicitis at the Mayo Clinic, outlined the ideal method of conservative treatment for early peritonitis associated with acute appendicitis, suggesting that general support of the patient should include oxygen as necessary, warm packs to the abdominal wall, and opiates for relief of pain. The patient's fluid and electrolyte needs should be maintained with intravenous replacement therapy and with blood or plasma as indicated. Gastrointestinal distention should be relieved by decompression and Wangensteen suction. The inflammatory reaction in the peritoneum should be controlled with large doses of penicillin and streptomycin sulfate, or with intravenous tetracycline hydrochloride. The recommended dosage of penicillin was 600,000 units every 12 hours with one-half gram dihydrostreptomycin every six hours. The dosage of tetracycline

hydrochloride was given as 500 mg intravenously every six hours.

MATERIAL

Over a nine-month period beginning 1 July 1957, 14 patients with acute appendicitis were transferred to this hospital after receiving initial therapy in a remote or isolated installation where facilities for appendectomy were inadequate from the standpoint of assigned personnel or available equipment. Group A consisted of seven patients in whom appendectomy was performed or attempted before transfer, and Group B consisted of seven patients in whom conservative regimen was employed initially with early evacuation to this hospital.

CASE REPORTS

Group A, Appendectomy Attempted or Performed Before Transfer

Case 1. This 19-year-old youth entered this hospital some 30 hours following performance of an appendectomy in an isolated installation. History related an 11-hour illness prior to the operation, consisting of typical generalized abdominal pain, nausea and vomiting, with shifting of pain and tenderness to the right lower quadrant. The appendectomy had been attempted through a low paramedian incision, and at the time of operation visualization of the appendix was difficult. Further difficulty was encountered with anesthesia. Originally, subarachnoid Pontocaine (brand of tetracaine hydrochloride) anesthesia had been attempted but this had to be supplemented by open-drop ether. The total time for the operation was listed as five hours. Perforation of the appendix was found, with fecal contamination present throughout the lower abdomen. The treatment of the appendiceal stump was not known. Closure of the peritoneal cavity and muscle layers had been accomplished with interrupted silk sutures. A No. 14 soft rubber catheter had been placed through the primary incision into the peritoneal cavity for drainage. Penicillin and streptomycin sulfate had been given postoperatively.

On admission to this hospital the patient showed a markedly distended abdomen, lack of peristalsis, and a temperature of 99.4°F. The wound was edematous, reddened and indurated. Routine laboratory findings, electrolyte level, and roentgenograms of the chest were within normal limits. The patient was continued on penicillin and streptomycin sulfate intramuscularly with fluid supplements intravenously and gastrointestinal decompression. On the second day of hospitalization, the wound was opened because of seropurulent drainage. Sutures were removed and the wound was found to be grossly infected, requiring daily care and subsequent closure by secondary intention. The patient's course in the hospital was prolonged by low-grade fever, malaise, and adynamic ileus for four days. This patient's total hospital stay was 24 days, after which time he was discharged to a light duty status.

Comment: A five-hour operation for appendicitis is prima facie evidence that conservative management would have been safer and less traumatic. The use of silk sutures for wound closure in case of a ruptured appendix invites wound infection persisting until all sutures are extruded. Here, the sutures were removed, the wound was left open, and secondary closure was used after a clean wound had been attained. This patient may yet in the next several months return with drainage. Rarely should a drain be left in the peritoneal cavity itself, suction to remove free exudate being sufficient. If drainage is employed, a soft Penrose type drain rather than a catheter is better because a rubber tube may cause bowel erosion and fistula formation. A drain in the soft tissues of the abdominal wall is preferable to a drain in the peritoneal cavity because the wall is more vulnerable than the peritoneum whose prime function is to deal with organisms.

Case 2. This 21-year-old man entered this hospital after a three-day illness of generalized abdominal pain, nausea and vomiting, and later localization of pain to the right lower quadrant. An appendectomy had been planned with open-drop ether anesthesia. During the induction period, the patient had developed severe laryngeal spasm and vomiting with resulting aspiration. Because of this the operation had been discontinued and 12 hours later, under Pontocaine subarachnoid anesthesia, a right-sided McBurney's incision had been made through which the appendix had been visualized and found to be indurated and densely adherent to the surrounding structures. It was reported as having been neither suppurative nor gangrenous and the operating surgeon had decided not to remove the appendix. The abdominal cavity, therefore, had been closed. The patient then was transferred to this hospital.

On admission here, his temperature was 101.2°F and he was in acute distress. Both lung fields revealed evidence of pneumonitis and atelectasis. The abdominal wound was indurated and tense. No bowel sounds could be heard. A leukocytosis was present. Roentgenograms of the chest substantiated the diagnosis of pneumonitis and bilateral lower lobe atelectasis. The patient was treated with large doses of penicillin and streptomycin sulfate administered intravenously, gastrointestinal decompression, and intravenous fluids and electrolytes. On the second day of admission, several sutures were removed from the wound, followed by the release of considerable blood and seropurulent material. The wound infection was treated with daily care and the wound was allowed to close secondarily. Approximately three weeks following admission, an elective appendectomy was performed, the retrocecal appendix showing evidence of a recent acute inflammatory process. There were dense adhesions to surrounding structures and the peritoneum was thickened and friable. The pathologic report was that of subsiding acute appendicitis and gangrene. The total course in the hospital was 43 days.

Comment: Vomiting and aspiration can happen in the best hands, but had subarachnoid anesthesia been the original choice, the pulmonary complications might have been avoided. Open-drop ether is not necessarily the simplest choice in an adult male patient, and in the hands of an inexperienced anesthetist. There seems little to commend the philosophy of inspection of the appendix with the decision to leave it *in situ* because it does not look too bad. Even prophylactic appendectomy in a case of mistaken diagnosis is preferable.

Case 3. This 28-year-old man entered this hospital two months following the initial illness, consisting of abdominal pain which had developed in an isolated installation. He had been treated initially with mineral oil and cascara. About six days following the onset of illness, the patient had had intensification of pain within the abdomen, with accompanying fever and distention. He had been transferred to a larger installation where an exploratory laparotomy was performed with the preoperative diagnosis of acute appendicitis. At the time of surgical intervention, a large amount of free purulent material had been found in the abdominal cavity. Removal of the appendix had not been attempted. A large abscess cavity beneath the rectus sheath had been drained and the abdominal cavity had been closed. Postoperatively, the patient had had periods of diarrhea, recurrent temperature elevations, and a subsequent mass had developed in the left lower quadrant of the abdomen. A secondary exploratory operation was performed and a large amount of purulent material was drained from the left lower quadrant mass. The patient again developed fever and pain, and a third mass in the midline of the lower abdomen was found which required incision and drainage. The patient was treated with multiple antibiotics during the initial hospitalization and then was transferred to this hospital for further care.

On examination at this hospital the patient appeared chronically ill and debilitated. His oral temperature was 100.8°F. His pulse and blood pressure were normal. Examination of the abdomen revealed several scars with two draining sinus tracts in the left lower quadrant of the abdomen, both of which could be probed down through the abdominal musculature. There was generalized tenderness in the entire abdomen but no masses could be felt. Sinus tract injections with Lipiodol (brand of contrast medium) revealed the tracts to be multiple throughout the anterior abdominal wall. A barium enema revealed no connection between the large bowel and the abdominal sinus tracts. Shortly after admission, fecal material was noted to drain from the sinus tracts, and these were treated with local irrigations and later a continuous suction catheter. Approximately 100 ml of purulent, foul-smelling material was discharged daily. Drainage ceased within two weeks and an exploratory laparotomy revealed a perforated appendix lying to the medial aspect of the cecum. The appendix was removed without difficulty and the abdominal cavity was closed. On the eighth postoperative day, the patient developed an inflammatory mass in the old laparotomy incision, which was drained of approximately 400 ml of purulent material. This wound was treated by saline

irrigations and allowed to heal by secondary intention. The remainder of the patient's stay in the hospital was complicated by recurrence of purulent discharge from the two sinus tracts in the left lower abdomen, which subsequently closed. The patient's total time away from duty was approximately 240 days, at which time he was discharged to a light duty status.

Case 4. This 32-year-old man entered the hospital after a three-day history of abdominal pain with localization in the right lower quadrant. He had been operated on the second day of his illness at a remote installation. The surgeon had made a right lower quadrant McBurney's incision which later had been extended vertically for added exposure. The appendix lay high in a retrocecal position, being grossly gangrenous throughout its length. The operative procedure had lasted six and one-half hours. No drains had been placed in the wound and the patient had been started on penicillin and streptomycin sulfate postoperatively.

On admission to this hospital—on the first postoperative day—the patient was acutely ill. His oral temperature was 103.2°F, his pulse rate was 104 per minute, his abdomen was distended, and he was vomiting. No abdominal masses could be felt. He was continued on intravenous penicillin and streptomycin sulfate and fluid and electrolyte, as necessary, for a 10-day period. On the seventh day, a wound abscess became apparent and the sutures were removed. The wound was opened wide and treated with local irrigation and allowed to close by secondary intention. Following healing of the wound, the patient was returned to a light duty status after 23 days of hospitalization.

Comment: Inasmuch as this patient was transferred to this hospital on the day after operation, he might just as well have been transferred before operation, thus avoiding a six and one-half hour procedure. Major surgery should not be performed in an installation where appendectomy requires this length of time.

Case 5. This 25-year-old man entered this hospital after having undergone an appendectomy at another installation two days prior to his admission here. The duration of illness had been some 40 hours prior to the surgical procedure. The appendix had been reported as gangrenous with a small perforation present.

On admission to this hospital, the patient was comfortable and had a normal temperature and pulse. Bowel sounds were present and normal. The patient was treated in the usual manner with regular diet and ambulation about the ward. On the seventh postoperative day, redness and induration became apparent about the wound, which required removal of the sutures and drainage of a large wound abscess. This was irrigated and after 10 days was closed secondarily with stainless steel wire. Healing was rather slow and the patient was discharged to light duty after a total of 41 days lost from duty.

Case 6. An appendectomy was performed on a 46-year-old white man who had developed symptoms and signs of acute appendicitis 72 hours

before. The findings were those of acute suppurative appendicitis without perforation. The patient's subcutaneous wound was drained postoperatively and he was transferred to this hospital on the third day.

On admission to this hospital the patient's oral temperature was 100.4°F and his pulse rate was 92 per minute. He had hypoactive bowel sounds with some abdominal distention. Rectal examination findings were normal. A roentgenogram of the chest revealed an area of discoid atelectasis in the left base near the apex of the heart. During the initial period of hospitalization, abdominal distention became more marked and bowel sounds were absent, which required gastrointestinal decompression. The patient continued to have an elevation of temperature and increase in discomfort. On the sixth day of illness, the abdominal wound showed signs of abscess formation. The sutures were removed and the wound opened wide, yielding a large amount of bloody purulent material. On the eighth day the Levin tube was removed and the patient started on oral feeding. Shortly, however, he again developed distention with high-pitched intermittent bowel sounds, nausea and vomiting.

An exploratory laparotomy was performed with the operative findings being those of dense, fresh, inflammatory adhesions involving the distal ileum and cecum with complete small bowel obstruction. Approximately 1,000 ml of old blood was found in the pelvic peritoneal cavity. The patient was continued on large doses of penicillin and streptomycin postoperatively and also was given blood transfusions and electrolytes as necessary. His temperature remained at a high level with a pulse rate averaging 130 per minute. Drainage from both the paramedian and McBurney's incisions was considerable. With improvement the patient was again started on oral feedings and again developed clinical and roentgenographic findings of mechanical small bowel obstruction. A second exploratory laparotomy was necessary. Dense adhesions of the terminal ileum were found, requiring small bowel resection with end-to-end anastomosis of the ileum. Following this last procedure, the patient improved gradually with subsequent closure of the abdominal wound by secondary intention. He then was transferred to a mainland hospital for further convalescence after 62 days of hospitalization.

Comment: It is apparent that the huge pelvic accumulation of blood became infected secondarily, leading to the intense inflammatory reaction and fibrotic peritoneal response. Difficulty with hemostasis is postulated as the basic cause.

Case 7. This 42-year-old man developed acute appendicitis and after three days of illness, appendectomy was performed. Operative findings were reported as acute inflammation of the appendix with early perforation present. The appendix was removed but inversion of the stump was not attempted. The duration of the operation was one and one-half hours. The patient was treated with penicillin post-

operatively. He was transferred to this hospital on the second day following operation.

On admission to this hospital, the patient's temperature was 101.4°F. General physical examination revealed a rather acutely ill patient with a quiet, distended abdomen. There was erythema and tenseness about the right lower quadrant wound. Several silk sutures were removed to allow drainage of serous material. On the sixth postoperative day, bile-stained drainage was seen exuding from the wound. Following this a definite fecal fistula developed, which was controlled with continuous catheter suction followed by intermittent saline irrigations and spontaneous closure of the fistula after 21 days. The patient's total hospital stay was 29 days, following which he was returned to a light duty status for further convalescence.

Comment: Fecal fistula occurs infrequently after appendectomy and there is no agreement as to whether the appendical stump should be inverted. Unfortunately, in the cases where there is such severe reaction that stump ligation is insecure, there usually is such severe cecal reaction that placement of a purse-string suture is hazardous so that when stump inversion is most needed it technically may not be feasible.

Group B, Conservative Regimen Employed Before Transfer

Case 1. This 19-year-old youth entered this hospital after a four-day history of generalized abdominal pain with localization in the right lower quadrant, the onset of which occurred while he was on board a naval vessel. A corpsman on the vessel thought that the patient had acute appendicitis, and had subsequently placed him on complete bed rest, nothing by mouth, and intravenous administration of dextrose and water with penicillin and streptomycin added. The patient stated that within 36 hours he was relatively asymptomatic. He was first seen at this hospital four days after the onset of the illness.

The physical examination was entirely within normal limits with the exception of deep, poorly localized tenderness in the right lower quadrant. Blood cell count, urinalysis, and a roentgenogram of the chest were normal. The patient was continued on penicillin and streptomycin sulfate but he was ambulatory and was given a soft diet. On the tenth day of illness, an elective appendectomy was performed. At the time of surgical intervention the appendix was retrocecal in position and showed definite signs of acute and chronic inflammatory changes with fresh adhesions to surrounding structures. No perforations were seen. The pathology report confirmed the diagnosis of acute suppurative appendicitis. Postoperatively, the patient's course was essentially normal and he was discharged to a full duty status on the fourteenth day.

Comment: In the absence of a doctor the enlisted corpsman showed excellent judgment which contributed to an uncomplicated course and excellent recovery. It is interesting that ten days after onset, there was no perforation.

Case 2. This 20-year-old youth developed generalized abdominal pain with localization in the right lower quadrant, and nausea and vomiting while on board a naval vessel 10 days prior to admission to this hospital. He was started on penicillin and streptomycin sulfate in conjunction with intravenous fluid therapy, complete bed rest, and nothing by mouth. He stated that he was asymptomatic from the fifth day of illness. Physical examination was entirely within normal limits, as were his oral temperature and routine laboratory work. The patient was observed for two days without antibiotic therapy and remained afebrile and comfortable. On the following day, the eleventh day following the onset of illness, an appendectomy was performed which revealed an inflamed appendix in a retrocecal position with fresh inflammatory adhesion surrounding it but without perforation. Microscopic examination revealed both acute and chronic inflammatory changes. The patient's postoperative course was essentially uneventful and he was returned to a full duty status after 18 days.

Case 3. This 21-year-old man entered this hospital after eight days of illness consistent with the impression of acute appendicitis. He had been treated on board a naval vessel with complete bed rest, a liquid diet, and large doses of penicillin for a four-day period, therapy beginning on the third day of illness.

Physical examination findings on admission to this hospital were entirely within normal limits, as were routine laboratory studies and a roentgenogram of his chest. The patient was continued on penicillin, and streptomycin was added. He was given a regular diet and ambulatory privileges about the ward. After five days of observation, an elective appendectomy was performed. Findings at operation consisted of subsiding acute appendicitis which was confirmed by pathologic examination. The patient's postoperative course was complicated by furunculosis, which lengthened his hospitalization to a total of 30 days. He then was returned to full duty.

Case 4. This 20-year-old youth entered this hospital 36 hours after the onset of abdominal pain with associated nausea and vomiting, characteristic of acute appendicitis. Treatment instituted on board a naval vessel had consisted of complete bed rest, nothing by mouth, and large doses of penicillin. He was evacuated to this hospital by air.

On admission his oral temperature and pulse were normal. General physical examination revealed point tenderness with muscle spasm over the right lower quadrant of the abdomen with rebound tenderness. A mild leukocytosis was present. He underwent an appendectomy on the day of admission. The operative findings were those of acute suppurative appendicitis. His postoperative course was uneventful and he was dicharged to a full duty status on the sixteenth day.

Case 5. This 21-year-old male was seen in this hospital five days after the onset of abdominal pain, nausea, and vomiting while he was on board a naval vessel. The diagnosis of acute appendicitis was

made and intravenously administered penicillin and streptomycin were started. Within 72 hours the patient was comfortable and asymptomatic. Routine laboratory studies and a roentgenogram of the chest were normal. Antibiotics were discontinued and the patient was observed for two days. He remained afebrile and comfortable. On the seventh day of illness, an appendectomy was performed with the findings at operation being that of acute appendicitis with suppuration, but without perforation present. The pathology report substantiated the above diagnosis. The patient's postoperative course was uneventful and he was returned to a duty status on the sixteenth hospital day.

Case 6. This 13-year-old boy entered the hospital on the second day of illness characteristic of acute appendicitis. Under spinal anesthesia an appendectomy had been attempted on board a naval vessel but because of an inadequate anesthetic level, only a skin incision had been made. The patient had then been treated with penicillin, streptomycin sulfate, and Terramycin intravenously and transferred to this hospital.

On admission to this hospital the patient had an oral temperature of 99.8°F and a pulse rate of 80 per minute. He had generalized abdominal tenderness with localization to the right lower quadrant. No masses were palpable. The skin incision had been sutured. He was continued on penicillin and streptomycin sulfate for five days, after which an elective appendectomy was performed. At the time of surgery the appendix was mildly injected, contained a moderate-sized fecalith, and was loosely adherent to surrounding structures. Pathologic examination revealed a leukocytic infiltration to the appendiceal wall, with the diagnosis of subsiding acute appendicitis and early gangrene. No perforation was found. The patient's postoperative course was uneventful and he was discharged on the fourteenth postoperative day.

Comment: The doctor in this case is to be commended for his good judgment in desisting in operative attempts in the face of inadequate ancillary facilities. Persistence might have resulted in a complicated course.

Case 7. This 18-year-old white male had the onset of generalized abdominal pain with localization to the right lower quadrant 48 hours prior to admission to this hospital. He was treated initially with mineral oil and enemas, with gradual intensification of pain, with radiation to the right testicle and in the right shoulder. On physical examination his oral temperature was 99.8°F, but the patient was rather acutely ill with diffuse abdominal tenderness present. No masses could be palpated. Admission white blood cell count was 18,900 per μl, with a marked increase in neutrophils. Urinalysis and a roentgenogram of the chest were normal. At the time of admission it was believed that the patient had an early perforation of the appendix. At the time of operation a small perforation was found with contamination of the surrounding peritoneum. The appendix was removed and the wound was drained postoperatively. Penicillin and streptomycin sulfate were added to intravenous feedings. A wound abscess developed, which

required continued drainage and irrigation, but the patient was fully ambulatory by the third postoperative day on a regular diet. He was returned to full duty status after 28 days lost from duty.

SUMMARY AND CONCLUSIONS

Appendectomy is a prophylactic operation to prevent perforation and the ensuing peritonitis, but in some instances due to deficiencies in personnel or equipment, appendectomy is more hazardous than conservative management with antibiotic coverage. When to attempt appendectomy and under what circumstances is a problem in judgment.

From reports in the literature, it is clear that peritonitis of appendical origin responds well to antibiotic therapy with surgical drainage of an abscess being rare rather than the rule.

We have presented seven cases where appendectomy was performed or attempted under suboptimal conditions either because of unprepared personnel or lack of facilities. In these seven cases there were seven wound infections, two instances of pulmonary complications, two fecal fistulas, one pelvic hematoma, and one intestinal obstruction requiring two subsequent operations and a bowel resection. Another group of seven patients with appendicitis were treated by bed rest, intravenous fluids, antibiotics, and drugs for relief of pain because no doctor was available or the doctor believed that he was not prepared to perform an appendectomy. These patients were transferred to this hospital expeditiously, where appendectomy confirmed the diagnosis. There was one wound infection and no other complication.

The seven patients who had appendectomy under suboptimal conditions averaged 64.5 hospital days. One patient spent 240 days in the hospital, and if this excessively long case is deleted the average hospital stay was 37 days for this group. The seven patients who were treated conservatively, with appendectomy later at this hospital, averaged 18 days of hospitalization, omitting the 14 days required for nonconnected furunculosis in one patient.

The contrast between these two groups is obvious and graphic, emphasizing our view that if circumstances are unfavorable, conservative management gives less morbidity than operative attack. In no case did original conservative regimen produce morbidity that might have been avoided by earlier operation, and in every case hospitalization was shortened. It is strongly recommended that appendectomy be considered as an emergency procedure which is a "must" only where personnel and equipment are optimal. Delay with antibiotic therapy until more favorable circumstances can be attained is preferable, as borne out by the case material presented.

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PREVENTION OF DENTAL CARIES

There are three main lines of approach to the prevention of dental caries: the elimination or inhibition of bacterial activity, the removal of the substrate, and the increase of tooth resistance to attack. All these are being thoroughly investigated; the effect of optimum fluoride intake during tooth development is one example of a method of increasing resistance to caries. Meanwhile enough facts are known on which to base helpful guidance in prevention, and parents, properly instructed, can contribute much to the avoidance of dental disease in their children. At the 1958 Congress of the Royal Society of Health simple rules for the maintenance of dental health were given: (1) No eating or drinking between meals. (2) Regular mealtimes; a planned diet which allows the eating of chocolate and other sweetmeats only at table; the eating of fibrous fruits or vegetables such as apples or carrots at the end of meals to aid physiological cleansing of teeth. (3) The encouragement of children by example and instruction to use the bubble and swallow technique of rinsing the mouth with plain water three times after eating and drinking. (4) Instruction of young children in oral hygiene by parents and teachers showing the value of brushing the teeth, especially last thing at night.

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NONTOXIC THYROID NODULES: A CLINICAL DILEMMA

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MUCH has been learned about thyroid physiology and pathology since the turn of the century. Certain pathways of iodine metabolism have been clarified, and several distinct thyroid hormones have been isolated. The use of iodine 131 (I^{131}) and serum protein-bound iodine determinations have aided in the problem of diagnosis of thyroid disorders. Treatment of thyroid disease has also been facilitated, largely due to the availability of radioactive iodine and antithyroid drugs, as well as improvement in surgical technic.

Despite numerous advances, much concerning nontoxic thyroid nodules remains unknown, especially with regard to treatment. The importance of possessing a clear and distinct approach to such nodules cannot be underestimated because carcinoma of the thyroid gland frequently presents to the clinician in the form of such nodular lesions.

It is the purpose of this review to present current information which will help the practicing physician secure a rational approach to nontoxic thyroid nodules. Particular emphasis will be placed upon the multiple problems concerning the occurrence, detection, and therapy of nodules representing thyroid carcinoma.

EVOLUTION OF NODULAR GOITER

Nodular goiter is an entity of diverse etiologic factors, the most important of these being iodine lack. The average adult requires 100 to 200 micrograms of iodine per day; this requirement is somewhat greater in childhood and adolescence. Many goitrogens also have been incriminated in the cause of nontoxic goiter. These include minerals such as calcium, fluorine, and chloride; drugs such as thiocyanate, perchlorate, cobalt, resorcinol, para-aminosalicylic acid (PAS), sulfonamides; and certain foods, particularly cabbage, rutabaga, and soybeans. Taylor[1] utilized radioautography in over 100 patients with various types of simple goiter. The five stages listed below present his reconstruction of the evolution of nodular goiter.

From U. S. Naval Hospital, Memphis, Tenn.

Stage 1. Diffuse hyperplasia leading to a soft, vascular thyroid. Often the radioactive iodine uptake was increased. Histologically these glands possessed small follicles with moderate amounts of colloid.

Stage 2. This stage consists of either of two situations:

a. Multiple discrete areas of hyperfunction consisting of small follicles.

b. Solitary hyperactive nodules.

Stage 3. The foci of intense hyperactivity of the preceding stage appeared to inevitably progress to hemorrhage followed by central necrosis.

Stage 4. More of the nodules progressed to the point of becoming inactive autoradiographically.

Stage 5. The end result being multinodular nontoxic goiter, occurring as a consequence of repeated hyperplasia and destruction within the gland.

FREQUENCY OF CARCINOMA OF THE THYROID

The accurate incidence of carcinoma of the thyroid has created vigorous debate for many years. Opinion is sharply divided between those groups who believe that the disease is relatively common and those who maintain that it is a rare entity. Furthermore, there is even greater disagreement regarding the frequency of carcinoma in thyroid nodules of all types. Naturally, such conflicting opinions led to irreconcilable differences in judgment concerning therapy of these nodules.

Sokal,[2] in an authoritative discussion of the incidence of thyroid carcinoma, reviewed 122,000 cases of carcinoma of all types. Included in his review was a series of cases reported by Dorn[3] that represented 10 metropolitan areas of the United States, among which were goiter endemic areas. Dorn had enlisted the aid of every hospital and 98 per cent of the practicing physicians in these areas in order to obtain an accurate estimate of the total number of cases of cancer of all types under observation or treatment in these representative communities. Sokal concluded from his review of the literature that the average incidence of carcinoma of the thyroid was 0.56 per cent of all clinical carcinomas. He expressed the significance of the preceding figure as follows: "In a typical community of 1,000,000 people, there would be 25 patients with thyroid cancer."[2] Further emphasis on the infrequent occurrence of carcinoma of the thyroid is derived from the fact that this malignancy stands seventeenth in the list of cancers causing death and is only one thirty-seventh as common a cause of death in women as cancer of the breast.[4]

Conversely, Alexander[5] studied the occurrence of thyroid cancer in San Francisco and showed the prevalence to be far in excess (by approximately 400 per cent) of the hypothetical

value laid down by Sokal. Similarly, surgeons operating on the thyroid gland maintain, with rare exception, that the frequency of carcinoma of the thyroid is much greater than the figure reported by Sokal.

Table 1 gives statistics of the incidence of carcinoma in thyroid surgical specimens from representative clinics throughout the country.

TABLE 1. *Frequency of carcinoma of the thyroid in reported series of thyroidectomy cases*

Source of data	Clinic or hospital	City	Period	Number of cases	Frequency in all cases (per cent)
Cattell & Colcock[28]	Lahey	Boston, Mass.	1951-1952	78	5.3
Crabtree & Hunter[29]	Univ. of Michigan	Ann Arbor, Mich.	1935-1950	1,928	7.21
Foss[30]	Geissinger Municipal	Danville, Pa.	—	—	2.37
Horn[31]	Univ. of Pa.	Philadelphia, Pa.	1933-1945	2,079	3.0
Stubenbord & Noehren[32]	Deaconess Hospital	Buffalo, N. Y.	20 years	2,106	2.08
Warren, Alvizouri, & Colcock[33]	Harvard	Boston, Mass.	—	23,000	2.5
Cerise, Randall, & Ochsner[7]	Ochsner	New Orleans, La.	1942-1949	580	8.8
Majarakis, Slaughter, & Cole[20]	Univ. of Illinois Ill. Research & Educational Hosp.	Chicago, Ill.	1936-1952	1,429	5.2
Beal, Scholnick, & Stevens[21]	Depart. of Surg., Univ. of Calif. School of Medicine	Los Angeles, Calif.	1946-1952	200	7.5
Crile, G., Jr., & Dempsey[6]	Cleveland Clinic	Cleveland, Ohio	—	768	3.9

OCCURRENCE OF CARCINOMA IN THYROID NODULES

Disagreement concerning the incidence of thyroid carcinoma per se is intensified with regard to its occurrence in and relation to nodules. Table 2 illustrates the frequency of carcinoma found in thyroid nodules of various types. There is some agreement that solitary thyroid nodules are more often the site of malignancy than multinodular glands.

TABLE 2. *Frequency of carcinoma of the thyroid in solitary and multiple nontoxic nodular goiters reported following thyroidectomy*

Source	Clinic	City	Nontoxic nodular goiters			
			Solitary		Multiple	
			Number of cases	Per cent	Number of cases	Per cent
Lahey & Hare[8]	Lahey	Boston, Mass.	1,971	10.04	1,782	0.62
Cerise, Randall, & Ochsner[7]	Ochsner	New Orleans, La.	151	19.8	101	12.8
Majarakis, Slaughter, & Cole[20]	Ill. Research & Educational Hosp.	Chicago, Ill.	253	20.9	195	8.7
Beal, Scholnick, & Stevens[21]	Depart. of Surg., Univ. of Calif. School of Med.	Los Angeles, Calif.	85	4.7	48	2
Crile, G., Jr., & Dempsey[6]	Cleveland Clinic	Cleveland, Ohio	98	24.5	176	3.4
Cole, Slaughter & Rossiter[9]	Univ. of Ill.	Chicago, Ill.	92	24.0	100	11.0

There are several reasons why statistics derived from surgical thyroid specimens may be misleading. Such figures are necessarily obtained from a carefully selected population. Crile and Dempsey[6] pointed out that these patients are carefully screened, "first by the patient himself, who does not often consult a doctor unless the nodule is giving evidence of growth or function-

al activity; second, by the family physician or internist who detects the obvious benign quality of soft poorly defined involutionary nodules in the thyroid and hesitates to advise operation; and finally by the surgeon himself, who recognizes the innocuousness of small soft multinodular goiters, reassures the patient and discourages operation." Hence the surgical statistics are colored by the incidence of carcinoma found in already clinically suspicious nodules.[7] Included in these surgical statistics are often frank carcinomas of the thyroid even when the clinical diagnosis is obvious. Similarly, these statistics were derived largely from thyroid clinics to which often were channeled cases where the clinical differentiation of benignancy versus malignancy was sufficiently difficult to require operative procedure.

Furthermore, patients referred to leading thyroid clinics will often be referred by physicians, well aware of the clinic's policy, who hope to obtain confirmation of a preformed opinion. If the referring physician thinks malignancy exists, he will usually send his patient to a surgeon likely to recommend excision of the nodule, whereas the opposite will obtain if the referring clinician believes the lesion to be benign. Other patients with thyroid nodules may never come to surgical consultation.

In summary, the following conclusions regarding carcinoma of the thyroid may be reached: (1) We are unaware of the exact incidence of thyroid carcinoma because of the inherent inaccuracy in the methods used to collect statistical data. Sokal[2] believes that this lesion represents approximately one per cent of all carcinomas. (2) The frequency of thyroid carcinoma in relation to the type of nodular disease present also is uncertain. However, carcinoma is more likely to be present in a nontoxic, clinically solitary nodule than in a nontoxic, clinically multinodular gland.

RELATIONSHIP OF ADENOMAS TO CARCINOMA

If it were possible to clarify the relation between adenoma and carcinoma of the thyroid, the treatment of nodular thyroid disease would be on a more sound basis.

To some, cancers of the thyroid are malignant from their outset, and do not arise from a pre-existing benign or hyperplastic phase. Others believe that benign nodular goiter and carcinoma of the thyroid are related.

Lahey and Hare[8] emphatically stated that the origin of cancer is for all practical purposes in the pre-existing adenoma of the gland. They attributed this hypothesis to the valuable studies of Dr. Allen Graham. Cole, Slaughter, and Rossiter[9] likewise stated, "It is now agreed that carcinoma of the thyroid gland arises in adenomatous growths in the majority of instances."

More caution was urged by Cerise, Randall, and Ochsner[7] who observed that "many cases of carcinoma of the thyroid develop in pre-existing adenomas."

Ravdin[10] adopted an attitude which is slightly more conservative with reference to this disputed issue. He believed that, "A relationship of some sort between carcinoma and nodular goiter rests firmly on clinical grounds," and he went on to say, "It is safe to assume that nodular goiters provide a soil for neoplastic change (benign or malignant) but it is certainly not demonstrated that 80 to 90 per cent of carcinomas come from true adenomas."

Sloan[11] believed that an etiologic relationship between nonmalignant goiter and thyroid cancer has not been conclusively established. He was of the opinion that cancer of the thyroid gland is probably a cancer from the beginning and not a transformation from a benign nodule, but he implied that cancer appears to start as a relatively benign growth which gradually becomes progressively more malignant. This transformation is not one from a benign to a malignant change but a progression in the degree of malignancy. No evidence in this author's study indicates that true benign neoplasms subsequently become malignant.

Crile[12] stated that 80 per cent of the highly malignant thyroid carcinomas arise suddenly without any history of previously recognized adenomatous growths. He further maintained that if benign nodules did become malignant, one would expect to find a much higher incidence of carcinoma in nontoxic nodular goiter than is generally recorded. Crile corroborated Sloan's opinions by stating that most of the solitary nodules recognized eventually as carcinoma are carcinomas from the outset.

It seems reasonable, therefore, to summarize the conflicting opinions noted above by stating that a relationship between benign and malignant thyroid tumors is uncertain. Current opinions indicate that no such relationship exists. Carcinoma of the thyroid probably does not originate in a benign adenoma.

GENERALIZATIONS

There are many features of thyroid cancer that are not as disputed as its etiology. There is general agreement that this cancer commonly attacks a young population, because 50 per cent of the cases occur in patients under 45 years of age. The incidence of cancer in surgical series of thyroidectomies for nodular goiter in youth ranges from 31 to 59 per cent, distinctly higher than that reported for adults.

The absolute frequency of thyroid cancer is greater in females than males. The incidence of carcinoma in solitary thyroid nodules, however, is greater in males than females.

The natural history of thyroid carcinoma, especially the papillary variety, is often very long[11, 12] with no alterations in growth for periods as long as 10 to 20 years.

Clinical differentiation of solitary nodules from multiple nodules is notoriously difficult, as clearly illustrated by infrequent pathologic and clinical agreement.

Furthermore, the accuracy of differentiating benign from malignant thyroid lesions remains subject to much disagreement. Using histologic evidence of blood vessel, lymphatic, or capsular invasion, and invasion of normal adjacent gland as criteria has not eliminated this confusion. Histologic criteria also have been found to be notoriously inaccurate in determining the prognosis of this malignancy.

PREOPERATIVE DIFFERENTIATION

The use of radioactive iodine has been extended from diagnosis and therapy of thyroid disorders to the investigation of characteristics that supposedly differentiate benign and malignant thyroid nodules. Rawson and his collaborators,[13] and Dobyns and Maloof[14] found that the maximum uptake of any of the cancerous nodules was decidedly less than that of normal adjacent thyroid tissue. In 1950, Means[15] stated, "So far we have never found a hot nodule which has shown histologic evidence of malignancy."

Using special isotopic technic, Perlmutter, Slater, and Attie[16] compared the relative avidity for I^{131} of clinically solitary nodules or nodules limited to one lobe with that of the contralateral uninvolved part of the gland. A nodule was classified as "hot" if it collected considerably more radioisotope than the contralateral side, and as "cold" if it collected considerably less than the other side. Those with intermediate values were considered to be "warm" nodules. In 1954 these authors reported a study of 85 such clinically solitary nodules. None of the 24 "hot" nodules were found to be malignant but 20 per cent of the warm and 32 per cent of the cold nodules were classified as malignant by the surgical pathologist. Since this original study their series of cases has been extended to 140, the findings remaining the same. Johnson and Beierwaltes[17] carried out a similar study with results comparable to those of Perlmutter, Slater, and Attie. Since the beginning of this use of I^{131}, clinically solitary "warm" and "cold" nodules have been grouped separately from "hot" solitary nodules regarding the suspicion of carcinoma, with the former two types considered highly suspicious as to malignancy. The definition of a "hot" nodule is considered by these authors[16] to be one which concentrates at least 125 per cent as much I^{131} as the non-nodular portion of the gland. A nodule that concentrates less than 125 per cent I^{131} compared to the remainder of the gland is considered "cold." Perlmutter and Slater[18] also used I^{131} with directional counting

over multinodular glands with predominant nodules for a similar purpose. However, it must be stressed that the distinction between "hot" and "cold" nodules applies only to clinically solitary nodules. Sufficient study of multinodular goiters using this technic has not been done as yet.

CHOICE OF THERAPY

The controversy with regard to nodular thyroid disease quite understandably extends to the various aspects of therapy for this condition. Hinton and Lord[19] offered a simple solution to the entire problem, stating that all nontoxic thyroid nodules be removed, regardless of whether they appear, clinically, to be solitary or multiple. Their reason for this opinion was their belief that a large number of such nodules will contain unsuspected carcinoma. Cerise, Randall, and Ochsner[7] concurred in this policy of removal of all thyroid nodules. This approach was defended by virtue of their opinion that one is unable to differentiate carcinoma from benign nodular goiter in 50 per cent of all cases. Removal of all thyroid nodules is advocated by other surgeons.[20, 21]

Hermanson, Gargill, and Lesses[22] reiterated the opinion that all thyroid nodules should be removed regardless of the clinical suspicion separating solitary from multinodular lesions. They defended this policy by repeating the well-known dictum that the clinical differentiation of solitary from multiple nontoxic nodules is notoriously inaccurate. More important, they stated that asymptomatic multinodular goiters should be considered as potentially malignant.

Those who believe that surgery is the treatment of choice in all nodules justify this policy by one or more of the following generalizations: (1) Cancer of the thyroid is fatal; (2) The person in whom cancer is found unexpectedly has a much greater chance of survival than one in whom the disease is clinically suspected; (3) Removal of all nodular goiters eliminates potential carcinoma.

Sloan[11] offered a more conservative approach and suggested that all clinically discrete thyroid adenomas should be removed, especially in young people and male patients. Adherents to this philosophy state that all nontoxic goiters should not be removed unless clinical suspicion of carcinoma is present, such as fixation of a nodule; lateral, cervical, or Delphian node metastasis; hoarseness; dysphagia; or other local symptoms and signs are present.

In 1957, Sokal,[23] as might be expected from earlier expressions of his opinion, urged that the great majority of nontoxic nodular goiters need not be extirpated. It was his opinion that enlarging, discrete tumors of the thyroid and nodules producing distinct pressure symptoms warrant removal. On the other hand,

soft, smooth, round nodules that do not grow may be treated with iodine or dessicated thyroid extract in order to observe the effect of these medications on the size of the nodules, or they may be left alone. He believed that it is justifiable to observe all nodules for a reasonable period.

The rationale for the use of thyroid in the therapy of nodular disease of this gland dates back as far as 1894. In 1953, Greer and Astwood[24] reported excellent results using dessicated thyroid in the treatment of patients with single or multiple nontoxic nodules. Regression in the size of the lesions occurred in a considerable number so treated. Greer and Astwood implied that a reduction in the nodule size, presumably brought about by thyroid-stimulating hormone (TSH) suppression with thyroid extract, is an indication that nodule formation represents a physiologic rather than a pathologic process.

Crile[12] reiterated the views held by Greer and Astwood, and stated that nontoxic nodular goiter arises because of primary failure of thyroid epithelium to secrete sufficient thyroid hormone. There is resultant stimulation of pituitary TSH production, with compensatory thyroid enlargement.[25] He pointed out the futility of subtotal thyroidectomy in the treatment of thyroid disease, because this aggravates the decompensation and further stimulates the production of TSH, causing hyperplasia and further nodule formation in the thyroid remnant. The high incidence of recurrent nontoxic nodular goiter, in addition to the discovery of carcinoma in thyroid remnants, is explained in this manner. There is clinical confirmation to support the opinion that thyroid cancer may be stimulated to rapid growth by excess pituitary TSH. Conversely, such have been shown to regress when thyroid extract is employed, which diminishes TSH output. Hence, Crile stated that thyroid extract is the treatment of choice for small nodular goiters, but that large nodular glands should be removed if excessive pressure or neck disfigurement arises. Removal of all multinodular goiters is not advocated because of the frightening morbidity and mortality associated with total thyroidectomy, an operation which must be utilized if one believes all thyroid nodules represent or will become cancer.[25]

With respect to clinically solitary adenomas occurring in youth, Crile advocated removal of all these because they frequently represent papillary carcinomas or adenomas that behave like malignant lesions. Between the ages of 40 to 60 years, despite the frequency of involutional nodules in thyroids of this age group, papillary carcinomas and low-grade nonpapillary carcinomas are common. Therefore, "all clinically discrete, firm, solitary tumors in middle age patients should be removed."

In patients over 60, nodules have often been present for many years and some of these may be calcified. These tumors are

frequently benign and, if malignant, often grow so slowly that they rarely cause difficulty during the normal life expectancy of such individuals. Hence, Crile reserved operative procedure for older patients when firm consistency of the nodules or history of recent growth arouses suspicion of existing carcinoma.

Miller[26] further condemned the removal of all nodular thyroid glands. He defended his position by stating, "If the policy of removing all nodular thyroid glands was followed in this clinic, it would be necessary to operate on 3 of every 100 new patients registered. The value of such an approach to the cure of thyroid cancer would be measured in maximum terms of one death a year if all such cancers arose in nodular goiters. The disadvantages in terms of morbidity, rare mortality, patient resistance, and increase in general cost of medical care seem to be prohibitive."

An attempt at a physiologic approach to solitary nodules was promulgated by Perlmutter and Slater.[16] They recommended surgical removal of the goiter, regardless of the results of laboratory investigation, in patients under 25 years of age and in those with clinical evidence of neoplasia, such as local lymph-node enlargement, nodule fixation or hoarseness associated with vocal cord paralysis. In the remaining patients, 24-hour I^{131} uptake, serum protein-bound iodine (PBI) determinations, and at times basal metabolic rates are performed. Determination of "hot" versus "cold" nodularity is routinely attempted by utilizing special isotope technic in clinically uninodular glands and in multinodular glands with predominant nodules. Surgical excision is advised in patients with normal total-gland I^{131} uptakes possessing either "cold" or "warm" nodules, and in patients with high total-gland I^{131} uptake but possessing "cold" nodules. Hot nodules not responding to triiodothyronine therapy by reduction in size also are excised.

Finally, Hurxthal and Heineman[27] considered the following points "either lead to a clinical diagnosis of cancer or a high degree of suspicion of cancer or are indications for surgery":

All cases of clinical chronic thyroiditis without a clear history of acute thyroiditis in the past—this means a hard, often diffusely involved thyroid gland.

Fairly recent or rapid enlargement of a previously existing nodule or nodular goiter, or both.

All firm or hard discrete nodules, especially in patients under 50 years of age and in children.

Firm, persistent lymph nodes or nodules in the neck adjacent to the thyroid gland.

Nodular goiter or discrete nodules adherent to surrounding tissues.

Nodular goiter with laryngeal paralysis or neck pain without other adequate explanation, or both.

Toxic nodular goiters. (Clinically, toxic goiter is unlikely in a small solitary nodule.)

All large nodular goiters causing considerable tracheal compression or unsightliness, if the age and cardiovascular status of the patient justify operation.[27]

SUMMARY

Carcinoma of the thyroid is an uncommon lesion, probably representing less than 1 per cent of all cancer in an unselected population. It probably does not develop from a benign adenoma but originates as carcinoma per se. It occurs more frequently in clinically solitary nodules than in clinically multinodular glands.

Total thyroidectomy is probably the treatment of choice when surgical intervention is indicated, the clearest indications being in young people with clinically solitary nodules, in older people with "warm" or "cold" single nodules, or in any patient in whom a nodular thyroid is associated with local lymph-node enlargement, tracheal compression, fixation to surrounding structures, or recent increase in nodule size that does not respond to therapy with thyroid extract. Whether or not multinodular thyroids deserve a surgical approach, unless there is clinical evidence of malignancy, is a highly debatable question.

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ASIAN INFLUENZA

Review of 1,264 Unselected Cases

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IN the spring of 1957 a new strain of influenza-A virus was born, or perhaps reincarnated,[1] in the Far East. In the subsequent eight months it produced a world-wide pandemic. By midsummer the marauder had reached the United Kingdom and produced widespread disease with a high morbidity. This article is a review of 1,264 patients with Asian influenza admitted to this hospital in the 19-week period between 11 August and 21 December 1957. They involved a younger age group in a better pre-existing state of health than in the general population. Because the rate of complications was higher than initially anticipated, particular emphasis has been placed on this aspect of the report.

MATERIAL AND METHODS

Inasmuch as this hospital is a general hospital primarily serving military personnel, and inasmuch as the vast majority of these patients live in barracks, it was deemed advisable to admit to the hospital all patients with a clinical picture of influenza. During the 19-week period between 11 August and 21 December, 1,333 patients were admitted to the specially isolated influenza wards. Of these, only 1,264 are reported in this study, because the remaining 69 patients did not demonstrate sufficiently typical symptoms or course of disease to justify a clinical diagnosis of influenza (table 1). Of the 1,264 patients, 1,035 (82 per cent) were adult males, 94 (7.4 per cent) were adult females, and 135 (10.6 per cent) were in the pediatric age group. In adults, the ages ranged between 14 and 45 years, with an average of 23.3 years. The pediatric patients ranged in age from 4 months to 13 years.

All patients were seen initially by a physician, and complete history and physical examination were carried out. Routine

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admission studies included a white blood cell count and differential, hemoglobin determination, urinalysis, and a roentgenogram of the chest. These and other laboratory studies were repeated when clinically indicated. Throat washings and paired serum specimens were obtained on all patients at the onset of the epidemic, but these were discontinued when it was established that we were dealing with an epidemic of A/Japan/305/57 virus. Agglutination studies, however, were performed on several desperately ill patients late in the course of the epidemic, and these also substantiated the clinical diagnosis of Asian influenza.

TABLE 1. *Hospital admission and complication rates per week of epidemic*

Week of epidemic	Number of admissions	Pneumonias		All complications	
		Number	Per cent	Number	Per cent
1	1	0	0	0	0
2	8	1	12.5	1	12.5
3	20	3	15.0	5	25.0
4	110	3	2.7	3	2.7
5	229	8	3.5	10	4.4
6	407	10	2.5	12	2.9
7	248	11	4.4	18	7.2
8	100	10	10.0	15	15.0
9	70	4	5.7	5	7.3
10	23	3	13.0	5	21.8
11	17	0	0	1	5.9
12	16	1	6.2	2	12.5
13	9	0	0	0	0
14	1	0	0	0	0
15	0	0	0	0	0
16	0	0	0	0	0
17	1	0	0	0	0
18	1	0	0	0	0
19	3	0	0	0	0
Total	1264	54	4.3	77	6.1

Routine treatment of the patients consisted of isolation from the general hospital population, bed rest, salicylates, high fluid intake, neo-synephrine nose drops (brand of phenylephrine hydrochloride), and a cough mixture (elixir of terpin hydrate with codeine). Antibiotics were not given unless indicated by the development of specific complications. Patients were not discharged from the hospital until they had been afebrile for at least 72 hours and had clinically recovered from the disease.

CLINICAL FEATURES

The most common symptoms (fig. 1) at the time of admission in the 1,129 adult patients were:

1. *Fever* (95 per cent). Patients who did not have fever at the time of admission either gave a history of fever or developed a febrile reaction shortly after admission.

2. *Malaise and myalgias* (91 per cent). The malaise varied from mild tiredness to severe prostration. The myalgias varied from generalized aching to low-back pain, the latter being present in the majority of all patients.

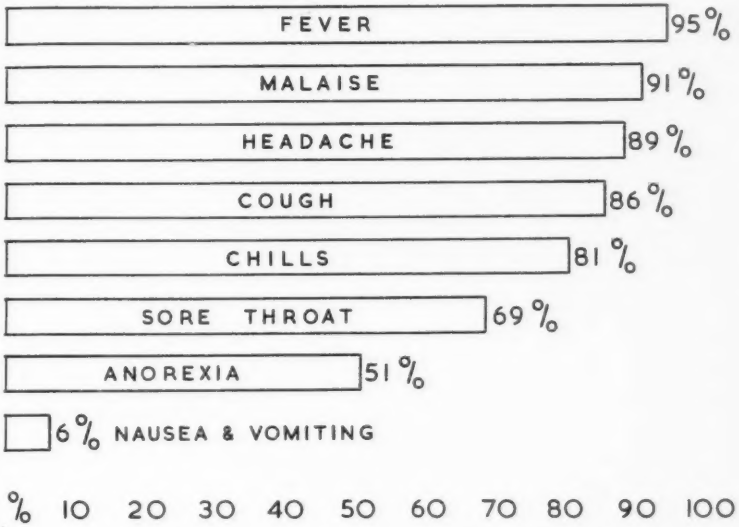

Figure 1. Frequency of specific symptoms in 1,264 cases of Asian influenza.

3. *Headache* (89 per cent). Most patients complained either of a dull, generalized frontal pain or of retrobulbar pain. The latter type was the most common. Very few patients required narcotics, and the headache disappeared after the first or second day.

4. *Cough* (86 per cent). During the first few weeks of the epidemic, the cough was dry, irritative, and nonproductive; however, as the epidemic progressed, an occasional case with productive type of cough was noted.

5. *Chills* (81 per cent). The type varied from severe shaking chills to chilly sensations, the latter being more frequent.

6. *Sore throat* (69 per cent). The severity varied from a scratchy sensation to actual difficulty in swallowing.

7. *Anorexia* (51 per cent). In a few patients this was one of the major presenting complaints. It was interesting to note that this complaint was more common in women than in men (72 per cent as compared to 49 per cent).

Other symptoms, found less frequently, included nausea and vomiting (6 per cent), chest pain (less than 5 per cent), somnolence, lethargy, and ocular pain. Epistaxis and diarrhea were rarely noted.

The illness was usually ushered in with a sudden onset of symptoms in a previously healthy individual. The average duration of symptoms at the time of admission was 29.2 hours. In a few instances the patient was suffering from coryza for several days prior to the explosive onset of the influenza syndrome. In these patients it is not known whether the coryza produced an increased state of susceptibility to influenza or whether these symptoms were actually the premonitory signs of an actual incubation of the influenza virus. From our current knowledge the former possibility is more likely.

Pyrexia ranged from 100 to 106°F and varied in type between constant and remittent, finally reaching normal in from 48 to 72 hours (fig. 2). After this time, the temperature usually remained normal unless complications intervened. Occasionally,

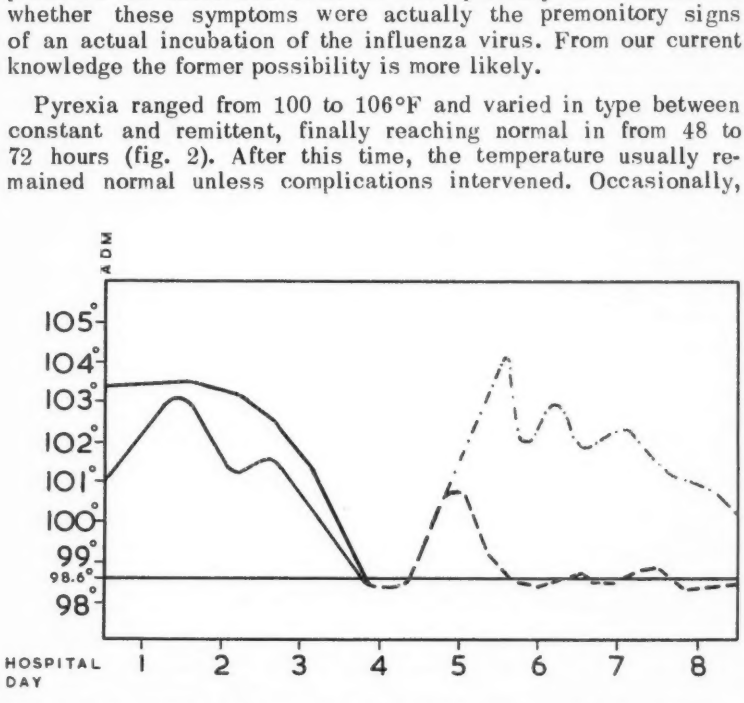

Figure 2. Typical febrile responses seen in 1,264 cases of Asian influenza. Key: —— Typical fever curve; - - - Febrile response occasionally seen in patients who developed no complications; . - . - . Febrile response in patients who developed complications.

the temperature spiked to moderately high levels on the fourth or fifth hospital day but returned to normal in 12 to 24 hours. If, in these instances, this second spike in temperature did not return to normal at the end of 24 hours an occult complication was suspected. This type of febrile response was so striking that, despite the absence of symptoms, a vigorous

effort was then instituted to discover the cause. A large number of the patients were found to have clinically asymptomatic respiratory complications of various types. Greene and Hair[2] reported the development of complications only in patients who failed to become afebrile within 72 hours. Only a minority of our patients who developed complications had the type of temperature curve described in their article.

After the pyrexia had subsided a large number of patients complained of severe sore throat but had no significant findings. This presented a problem in symptomatic therapeutics that gave no rewarding returns. In a few patients persistent hoarseness and hiccoughs became provoking and were resistant to any type of therapy.

In general, the complete physical examination of all patients upon admission revealed no abnormal findings except a nonspecific pharyngeal infection in 75 per cent of the cases. A small percentage of patients showed enlarged cervical and axillary lymph nodes and febrile conjunctival infection. On rare occasions rhonchi, wheezes, and discrete rales were heard in the chest in spite of negative roentgenographic findings.

The hemogram was usually normal, although 165 patients (14 per cent) showed an increase in the white blood cell count (above 10,000). A relative or absolute lymphocytosis was noted in approximately 4 per cent of patients.

As mentioned previously, routine chest films were obtained on all patients at the time of admission. In a number of the patients without complications there was a definite increase in the extent and prominence of the peribronchial markings. This is in keeping with the findings of Podosin and Felton.[3] In many instances it was possible to compare these admission roentgenograms either with previous or follow-up roentgenograms. In this way the difference in the extent of these peribronchial markings was well demonstrated; however, in the majority of cases this change was not present. These findings were not subjected to statistical analysis because the changes are relative and are often dependent on radiographic technic and interpretation and individual variation.

In pediatric cases, the picture was not significantly different except that the children usually appeared more ill at the time of admission but responded more rapidly to treatment. In general, they seemed to tolerate their illness slightly better than the adults.

COMPLICATIONS

Although uncomplicated influenza is a mild disease with a low mortality rate, the development of complicating illnesses markedly increases the dangers. The incidence of specific

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complications in this series is shown in table 2. The frequency with which complications developed remained fairly constant throughout the epidemic without showing any significant increase as the epidemic progressed (table 1).

TABLE 2. *Incidence of specific complications in 1,264 cases of Asian influenza*

Complication	Number of cases	Incidence (per cent)
Pneumonia	54	4.3
Sinusitis	8	0.6
Otitis media	8	0.6
Pharyngitis and tonsillitis	7	0.5
Total	77	6.0

Cases of sinusitis and pneumonia were diagnosed as such only when confirmed by roentgenogram. Sinusitis, otitis media, and pharyngitis were treated with appropriate antibiotics after culture of the causative organism and determination of its sensitivities had been performed. All of these patients responded to treatment promptly without supervening secondary complications. In only one of the eight patients with otitis media was myringotomy necessary. Although bronchitis was a common finding it was not included statistically in the complications because it was difficult, if not impossible, in most cases to demarcate accurately the fine line between the respiratory findings in uncomplicated influenza and the development of secondary bacterial infection.

Pneumonia developed in 4.3 per cent of the patients and was by far the most frequent and the most severe complication. In all instances, the diagnosis was confirmed by roentgenogram, and sputum cultures were obtained before antibiotic therapy was instituted. In the majority of these patients throat and blood specimens also were collected for culture before treatment. Negative roentgenographic findings were obtained on admission in 23 of the 54 cases of pneumonia. In the other 31 patients whose initial roentgenogram showed a pneumonic infiltrate, the diagnosis of Asian influenza had been established by a physician before the development of pneumonia. Many of these patients had had negative roentgenograms at other hospitals and dispensaries at the time of onset of the influenza syndrome. Those patients whose initial roentgenogram showed pneumonia but who had not had a previous diagnosis of influenza made by a physician were omitted from this study.

An analysis of the 54 cases of pneumonia is interesting. Thirty-six (3.5 per cent) of the 1,035 men admitted, 14 (15 per cent) of the 94 women, and 4 (3 per cent) of the 135 children developed pneumonia.

The extremely high frequency of pneumonia in adult females (14 cases, 15 per cent incidence) was surprising. Even more striking was the finding that 10 of these 14 cases occurred in pregnant women. A total of 20 pregnant women were admitted to the hospital, giving a 50 per cent incidence of pneumonia in the gravid female with Asian influenza. Of the 10 gravid women, 8 were in the last trimester. There was pre-existing heart disease (mitral stenosis) of moderate severity in one of these patients. The only death in the series occurred in a patient with a term gestation who developed a fulminating pneumonia, myocarditis, and congestive heart failure three days before a normal delivery. Although temporary improvement was manifest shortly after delivery, the patient died suddenly on the third post-partum day. Congestive heart failure developed in only 3 of the 54 patients with pneumonia. In each instance it occurred in gravid females in the third trimester and in each case, was associated with a severe disseminated pneumonia. In one patient with pre-existing mitral stenosis there were no electrocardiographic changes suggestive of myocarditis, and it was thought that the development of cardiac failure was the cumulative result of the increased cardiac demands imposed on a heart taxed by pregnancy and pneumonia. The other two instances of congestive failure occurred in previously healthy patients with no history of cardiac disease and no physical or roentgenographic findings such as murmurs or cardiomegaly. These were thought most likely to represent acute viral myocarditis.[4,5] The diagnosis was based on the finding of persistent resting tachycardia that was out of proportion to the fever and amount of pulmonary involvement, the development of a gallop rhythm, S-T segment changes in the electrocardiogram, increase in heart size, and the presence of congestive failure. Two of these three patients responded to antibiotics, digitalis, diuretics, and a low salt diet, and their cardiac status seemed to improve concomitantly with the resolution of pneumonia. It is impossible to assess the precise role of the pneumonia on their cardiac failure. As mentioned previously, the other patient succumbed on her third postpartum day; unfortunately permission for a postmortem examination was not granted.

Other complications in these 10 patients included the development of asymptomatic pleural effusions in four. Only one lung abscess was seen in all the 54 pneumonia cases, and this developed in one of the gravid patients with diffuse severe pneumonia. It is interesting to note that each of these 10 patients ultimately delivered full-term healthy infants, in spite of the fact that many of them were desperately ill either a short time before delivery or at the actual time of delivery.

If pregnant females are omitted from the totals for adult females, one finds only 4 cases of pneumonia in 74 patients

giving an incidence of 5.4 per cent, contrasted to 15.0 per cent in all adult females. This is more comparable to the observed incidence of 3.5 per cent in adult males.

ROENTGENOGRAPHIC CHANGES

The roentgenographic changes in the pneumonia cases were of great interest. It was arbitrarily decided to analyze these cases by dividing them into four groups: disseminated pneumonia, bronchopneumonia, segmental pneumonia, and lobar pneumonia. Two of these terms need further definition. Segmental pneumonia was defined as the type that produced the roentgenographic appearance of lobar pneumonia but which involved only one or more segments rather than the entire lobe of the lung. The criteria necessary for the diagnosis of segmental pneumonia were that the pneumonic infiltration have a homogeneous, dense area of consolidation which measured at least 3.5 cm in diameter with sharp borders, and that corresponded to one or more anatomic segments of the lobe. It was sometimes difficult to distinguish between segmental pneumonia and lobular type bronchopneumonia, and such cases were included in the latter group. Disseminated pneumonia was defined as pneumonic involvement of either broncho (lobular) or segmental type that involved two or more lobes which were not contiguous, that is, two or more obviously separated foci of infection.

Using these criteria, it was found that there were 11 cases of disseminated pneumonia, 36 cases with bronchopneumonic type infiltration, 6 cases of segmental pneumonia, and 1 case of lobar pneumonia. It is interesting to note that of the 11 cases of disseminated pneumonia that constituted 20.4 per cent of the total, 8 occurred in pregnant women, and these cases were by far the most severe and had the most pronounced roentgenographic changes. The chest films at the height of the illness in many of these women showed remarkably little aerated lung tissue remaining.

It was interesting but not surprising to note that the right lower lobe was the lobe most frequently affected in this series of cases (table 3). Nineteen cases of right lower lobe pneumonia occurred, three of which were segmental in type, and seven of the cases with disseminated pneumonia had involvement of the right lower lobe. Therefore, a total of 26 of the 54 patients with pneumonia had involvement of the right lower lobe (48.1 per cent). The left lower lobe was affected next most frequently with 13 cases, including the single case of lobar pneumonia. There were 6 cases of disseminated pneumonia that showed left lower lobe involvement. Therefore, this lobe was involved in a total of 19 of the 54 cases (35.2 per cent). As can be noted in table 3, the right upper lobe, right middle lobe, and left upper

lobe were least involved with 33.3 per cent, 14.8 per cent, and 7.4 per cent respectively.

TABLE 3. *Distribution of pneumonia by specific pulmonary lobes*

Radiographic distribution of pneumonia	All patients		Lobes involved in disseminated pneumonia	Lobes involved in all pneumonia patients	
	Number	Per cent	Number	Total	Per cent
Disseminated	11 (8)*	20.4	-	-	-
Right upper lobe	8	14.8	10	18	33.3
Right middle lobe	2	3.7	6	8	14.8
Right lower lobe	19 (1)*	35.2	7	26	48.1
Left upper lobe	1	1.9	3	4	7.4
Left lower lobe	13 (1)*	24.0	6	19	35.2
Totals	54 (10)*	100	-	-	-

*Number of pregnant patients in parentheses

Follow-up roentgenograms were taken on all patients and it was found that 19 had negative findings within seven days following the height of their pneumonia. Another nine patients with bronchopneumonia had negative roentgenographic findings within 8 to 14 days. Therefore, at the end of 14 days, 25 patients (46.3 per cent of the cases) had negative roentgenographic findings. Seven patients, including four with disseminated pneumonia, required 30 to 60 days for complete roentgenographic clearing. Six patients, including three with disseminated pneumonia, still had residual markings such as fibrotic scars, or pleural thickening after 60 days, and further follow-up was not obtained. Five patients did not have adequate follow-up and one patient died.

Seven patients had secondary clinical and radiographic complications, and five of these were in the disseminated group. Pleural effusion, two of which were interlobar in type, developed in six patients. Atelectasis complicated an additional four cases, and one lung abscess developed.

BACTERIOLOGIC EXAMINATION

Bacteriologic examination of sputum was performed in all 54 cases, and possible etiologic organisms were isolated from 19 cases. Neufeld typing was not performed on the cultures of *Diplococcus pneumoniae* and, consequently, it is impossible to state the pathogenicity of the organism in those cases in which it was isolated. The figures discussed below are presented with this fact in mind. Cultures for *Hemophilus influenzae* unfortunately were not performed. *Micrococcus pyogenes* var. *aureus* was the causative organism in 5 cases (in 4 of the 11 cases of disseminated and in 1 of the 36 of bronchopneumonia).

Sensitivity tests were determined in all cases and showed no consistent pattern. In each case the organism was sensitive to at least one antibiotic and in two cases was sensitive to three or more. Unfortunately, clinical results did not always confirm the *in vivo* testing. *D. pneumoniae* was isolated in 8 cases (in 1 of 11 disseminated cases, in 3 of the 6 segmental cases, and in 4 of the 36 cases of bronchopneumonia). Beta hemolytic streptococcus was uncommon and was isolated only in 2 cases (1 disseminated and 1 segmental). No pathogenic organism was isolated in the single case of lobar pneumonia. Of great interest was the fact that *M. pyogenes* var. *aureus* was the etiologic agent in only five cases and that each of these patients was pregnant. Of the 10 cases of pneumonia occurring in the pregnant women, half of them were due to this organism. It is interesting to speculate as to the possible reasons for the prevalence of this organism in the gravid patients. These patients were isolated from the other patients with pneumonia and from each other. They were, however, cared for by the same hospital personnel. Inasmuch as reverse precautions were not practiced, it is possible that cross infection could have occurred among the pregnant women. If this were the case, however, one would have expected a higher incidence of pneumonia caused by this organism in the nongravid women on the same ward. Perhaps the decreased tidal volume of air exchange, pulmonary congestion, or hormonal factors may have been primary predisposing factors underlying increased susceptibility to this organism in the gravid patient.

SUMMARY

An analysis of 1,264 unselected cases of Asian influenza was made. Because of the military population studied, 82 per cent were represented by adult male patients with an average age of 23.2 years. The remaining cases were fairly equally distributed between adult females and those in the pediatric age group. Clinical symptoms, laboratory and roentgenographic findings, and the typical course in uncomplicated cases are discussed.

Complications developed in 77 cases (an incidence of 6.1 per cent) that could be attributed directly to the disease. Pneumonia occurred in 54 patients. Of particular interest was the high incidence of pneumonia (50 per cent) in gravid women, and the finding that of 11 cases of disseminated pneumonia, 8 were associated with pregnancy. Bacteriologic studies made in the pneumonia cases yielded pathogenic organisms in only 19 of the 54 patients. Four of the 11 patients with disseminated pneumonia could be attributed to *Micrococcus pyogenes* var. *aureus*, and all these patients were pregnant.

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ON NOT GIVING MEDICINES

"The AMA ought to give a medal, occasionally, to doctors who refuse to order medicines for some of their patients! Many preparations in use today are potentially harmful, and many are valueless. Many pills are prescribed but never taken. Many of the pills that are prescribed are unnecessary for restoration of the patient's well being. Except for our knowledge that patients expect them, is there any reason why we keep doling out more and more pills? ... Many physicians are simply too busy to sit down and explain to the patient why he does not need any medication. One young doctor spent 30 minutes explaining to a patient whose complaint was a three-day-old bee sting that salves were unnecessary. Subsequently, he decided that if such a situation were to recur, he would prescribe an innocuous salve and save himself 25 minutes.... It would seem that we should honor the brave doctor who does not prescribe antibiotics for every cold, and who does not give shots to every patient who complains of fatigue. Let us remember that physicians who prescribe too freely don't treat their patients; they treat themselves."

—EDITORIAL
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THE CONFEDERATE MEDICAL OFFICER IN THE FIELD

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THE organization of the field and general hospital service of the Confederate medical department was interlocking at the top level during the first two years of the war. Surgeon-General Samuel P. Moore directed the activities of each, and in addition, the medical directors of armies and military departments had general control over all the medical officers and hospitals within the geographical limits of their commands. It was not until March 12, 1863, that a general order was issued by the Adjutant and Inspector-General's Office which altered this latter arrangement. Then general hospitals were removed from the jurisdiction of medical directors of armies and departments and placed under the authority of medical directors of hospitals.[1]

Each army corps had a medical director who was immediately responsible to the medical director of the army. Altogether there were 18 medical directors on duty in September, 1864.[2] Medical directors, in addition to being generally responsible for medical officers and hospitals under their control, were required to prepare for the Surgeon-General two monthly reports: a consolidated report of the sick and wounded and a return of medical officers. Directly below medical directors in the chain of command came the chief surgeons of the various army divisions; these were appointed upon the recommendation of the medical directors and were free from all regimental duty. Right under the division in the army's organization was the brigade, and each brigade had a senior surgeon—not relieved from regimental service—to oversee its general well-being. Medical directors, chief surgeons of divisions, and senior brigade surgeons were directed to make such recommendations regarding the prevention of disease and the "construction and economy of the hospitals, and . . . the police of the camps, as may appear necessary for the benefit and comfort of the sick, and the good of the service."[3] These officers, incidentally, were general—not personal—

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Presented before the Section on Historical and Cultural Medicine of The New York Academy of Medicine, March 27, 1957. Reprinted with permission from *Bulletin of the New York Academy of Medicine*, 34: 461-488, July 1958.

staff officers; hence they were not affected by personnel changes at the command level.[4]

Each regiment generally had one surgeon and one assistant surgeon to minister to its sick and wounded. A bill to authorize the appointment of an additional assistant surgeon to each regiment, passed by Congress in August, 1861, was vetoed by President Davis on the ground that existing legislation was sufficient to meet regimental needs.[5] That all medical personnel did not agree may be seen in the view expressed a year later by Lafayette Guild, Medical Director of the Army of Northern Virginia, that every regiment should have at least two assistant surgeons. Guild also contended that senior surgeons of brigades ought to be relieved from regimental duties and that one or more assistant surgeons should be attached to each brigade as supernumeraries "for assignment to field hospitals and . . . to supply deficiencies continually arising from sickness and death of regimental medical officers."[6] Records kept and reports made by medical officers in the field were very similar to those required of their counterparts in the general hospitals.[7]

General army regulations allowed regiments in the field one steward, one cook, and one nurse for each company.[8] Hospital stewards, appointed by the Secretary of War, performed duties similar to those executed by stewards in general hospitals. They took charge of the hospital stores, supervised the cooks and nurses, and acted as medical dispensers and apothecaries. Hospital Steward George E. Waller of the Twenty-fourth Virginia Regiment, for example, was left in charge of the field hospital during the entire winter of 1864-1865.[9,10] Nurses and cooks were usually detailed from the ranks,[11] and a special committee appointed by the Provisional Congress to investigate the medical department complained of poor nursing and cooking in the camps. The establishment of both an army nurse corps and a number of bakeries was recommended by the committee, but neither of the suggestions was deemed to be feasible.[12]

Medical officers in the field were faced with many problems similar to those in the general hospitals, and the regulations for the latter applied, as far as practicable, to the field service.[13] It should be pointed out, however, that after the early epidemics the number of sick in the field was never so troublesome and that most of the disabled were usually transferred to the general hospitals. As a rule, the most important work of field medical officers pertained to camp sanitation and caring for the men during and immediately following an engagement. Those functions will receive particular emphasis in this paper.

CAMP SANITATION

Regimental surgeons were responsible for finding out as much as possible about the sanitary condition of the camp site, learn-

ing of diseases common to the locality and the means which had been most successful in combating them, keeping a close watch over the clothing needs of the troops, maintaining proper police of the encampment, insisting on strict personal cleanliness, enforcing all hospital regulations, seeing that the water was pure, and suggesting necessary dietary changes.[14] Despite the sanitary regulations, however, actual conditions of camp police not infrequently manifested, to use the words of a Northern observer in describing Confederate hospitals at Gettysburg, "a deplorable want of cleanliness" and at times were "disgustingly offensive."[15] A Union army medical director, examining Confederate field hospitals during the Shenandoah Valley Campaign in late 1864, reported seeing "the most extreme filth and positive indications of neglect. . . ."[16] Confederate inspectors themselves also found police regulations disregarded at times and referred to the necessity of frequent camp inspections.[17] One inspector reported the ground surrounding a division hospital in Petersburg to be "offensive to the sight as well as the smell. In this important feature of cleanliness," he concluded, "there was evident and inexcusable neglect. . . ."

Directives concerning camp sanitation became increasingly strict as its importance became evident. A circular of the Second Brigade, Second Division, Army of Northern Virginia, dated August 3, 1862, ordered regimental commanders to publish and enforce all needful police regulations. Sinks were to be dug at once, and the men were to be compelled by posted sentinels to use them. Non-users were to be "severely punished." A patrol, in addition to the regular sentinels, was "to prevent the commission of nuisances within the camps." Offal was to be buried away from the camps.[18]

Surgeon General Moore ordered "frequent inspections" each month and a sanitary report to division headquarters.[19] In the Army of Tennessee, pursuant to an order of January 8, 1864, the old guard was directed to clean the encampments daily while company details policed their grounds twice daily and stood inspection after each policing. The brigade officer of the day was responsible for the proper placement and covering of sinks, the isolation of slaughter pens, the daily burning of offal, the policing of places where animals were kept, and for seeing "that nothing offensive to decency or detrimental to health be anywhere visible."[20] In August 1864 the Army of Northern Virginia's medical director instructed chief surgeons of divisions to make at least one inspection each week of the trenches occupied by their divisions. Chief surgeons and inspectors were directed "to confer and advise with the immediate commanders of troops, and, when deemed necessary, to make such suggestions, with reference to the observance of the laws of

hygiene, as will prevent disease and promote the health and comfort of the soldier."[21]

Naval officers commanding vessels on the Savannah River received a general order in April 1863 that clothes should be washed three times weekly and hammocks twice each month. Bedding was to be aired when hammocks were washed.[22] When the army was in winter quarters there were usually regular cleaning days or "broom days." During a campaign such days took place during a lull in the fighting. On these occasions the men became almost stifled by the large clouds of dust which resulted from the sweeping and rearranging, but the over-all effect was probably beneficial—for the moment at least.[23]

Responsibility for lax sanitary practices was often assigned to commanding officers in the field. Surgeon-General Moore, in a communication to the Secretary of War, dated October 18, 1861, charged regimental officers with failure to act on the suggestions of medical personnel in effectuating proper hygienic regulations, and he urged that all commanding officers be directed to see that police rules were scrupulously enforced by their subordinates.[24] Brigadier General Earl Van Dorn, commanding the Department of Texas in 1861, was accused of retaining Texan volunteers in an unhealthful location until practically all became diseased.[25]

Surgeon J. Julian Chisolm, writing in 1862, excoriated commanding officers for their failure to appreciate the importance of good hygienic conditions. The Confederate Army would continue to suffer heavily from sickness and death, he contended, unless officers "take more interest in the general welfare of their men, and cease to consider professional advice offensive and intrusive. . . . The sick list," he added, "will offer a fair criterion of the military status of an officer and his capacity for taking care of his men, which is one of the first rules in military science."[26] Observers sometimes noticed that vigorous enforcement of sanitary measures not only reduced sickness but greatly improved the discipline and spirit of the troops. It was asserted that General Lee's efforts along this line transformed the army which he took over from General Joseph E. Johnston, after the latter was wounded at Fair Oaks, from a mutinous and dissatisfied mob into a well-organized, hard-fighting military machine.[27] There is no question but that when commanders insisted on the frequent striking of tents, the punishment of every man who refused to use properly located privy vaults, the careful disposal of the excreta of the sick, and the correct placement of stables and pens for livestock, the salutary results were clearly evident.[28]

FIELD ROUTINES

Medical officers in the field held surgeon's call, or sick call, early every morning. In the Army of Tennessee sick call was made 15 minutes after reveille, and the ailing of each company were marched to the hospital by a non-commissioned officer detailed daily for such duty.[29] William H. Taylor, a medical officer, wrote of the procedure in his regiment as follows:

> Diagnosis was rapidly made, usually by intuition, and treatment was with such drugs as we chanced to have in the knapsack and were handiest to come at. In serious cases we made an honest effort to bring to bear all the skill and knowledge we possessed, but our science could rarely display itself to the best advantage on account of the paucity of our resources. On the march my own practice was of necessity still further simplified, and was, in fact, reduced to the lowest terms. In one pocket of my trousers I had a ball of blue mass, in another a ball of opium. All complainants were asked the same question, 'How are your bowels?' If they were open I administered a plug of opium, if they were shut I gave a plug of blue mass.[30]

The supply table authorized the issuance of tents for field hospital purposes,[31] but medical officers were sometimes unable to produce them. It was reported late in the summer of 1861 that because of the scarcity of tents farm houses were seeing service as hospitals all along the Potomac,[32] and the next summer General Lee requested division commanders, if possible, to establish their field hospitals in rented houses rather than tents.[33] Most surgeons favored the use of tents over buildings, however, and some believed them to be more conducive to recovery than the general hospitals.[34] Included among the latter group was Charles S. Tripler, Medical Director of the Union Army of the Potomac.[35] Surgeon General Moore's sentiments on this subject were reflected during the summer of 1863 by his order that three large tent hospitals be established near Staunton and Winchester to receive all those sick and wounded from the Army of Northern Virginia who required only "temporary assistance."[36]

Medical officers in the field had a considerable amount of time on their hands when the army was not in motion, and some, unable to obtain professional literature and increase their knowledge of medicine in that way, spent their free time writing letters, seeking out attractive members of the fair sex, attending religious services in the camp, and promoting various other social activities.[37] Occasionally medical societies were formed, and the members thereof met to discuss medical and surgical subjects. At least one such group had a dissecting hut which was fitted up by the surgeon of a Mississippi regiment. "We could easily procure subjects from beyond the lines," wrote a member

of this society, "and we thought it legitimate to use them for scientific and educational purposes."[38]

BATTLE PREPARATIONS

Careful preparations were made by medical officers in the field on the eve of expected battles. Medical Director Lafayette Guild ordered that each division medical wagon should transport 150 pairs of drawers, the same number of shirts, 50 blankets, a supply of tea, and some dessicated vegetables to make soup; these items were for the use of wounded during and after a battle.[39] Guild pointed out, in explaining this order, that the clothing of wounded soldiers almost always had to be cut off to facilitate treatment, and even when that was not the case, he added, it was "improper to permit the wounded men to remain in clothes rendered offensive and stiffened with blood." Guild also explained that men suffering from wounds and loss of blood were extremely sensitive to cold even in the summer and thereby needed the warmth afforded by blankets.[40] It is interesting to note that many men on naval vessels removed most of their clothing prior to an engagement; other preparations on board ship included a distribution of tourniquets to division officers and a thorough sanding of the decks "to prevent slipping after the blood should become plentiful."[41]

The medical director of general hospitals, in close contact with the army medical director, attempted as a rule to clear all hospitals near the expected battle site of those who could bear transportation to more distant institutions, and he advised the army medical director as to the number of vacant beds available in each of the hospitals under his jurisdiction.[42] At times, due to army movements, it was necessary to relocate general hospitals.[43] As the battle became imminent, brigade field infirmaries, identifiable by hospital flags, were established; to the extent practicable, these were located in buildings outside the range of shells, but strategically enough to maintain constant communication with both the front and the rear of the army.[44] Brigade medical personnel and supplies were sometimes consolidated for the purpose of setting up division infirmaries.[45]

THE INFIRMARY CORPS

An infirmary corps, comprising about 30 detailed men—usually the "least effective under arms"—and the assistant surgeon from each regiment, was responsible for the care of the wounded upon the field and for the removal from the field of those unable to walk. The assistant surgeon, who was in charge of the infirmary corps, was to equip himself with a pocket case of instruments, ligatures, needles, pins, chloroform, morphine, alcoholic stimulants, tourniquets, bandages, lint, and splints. All members of the infirmary corps were unarmed and wore a badge to dis-

tinguish them from the rest of the command. They were outfitted with one litter to every two men, and each member carried a canteen of water, a tin cup, and a knapsack; the latter was supposed to contain lint, bandages, sponges, tourniquets, four splints, and a pint bottle of alcoholic stimulants. The corps members accompanied the ambulance and were charged with following the action upon the battlefield.[46]

The infirmary corps was no place for cowards. As it advanced with the troops the assistant surgeon kept on the lookout for places suitable as first aid stations; due notice was taken of the topography and gullies deep enough to afford welcome protection were especially sought after. Work done by the corps was usually rather simple, but the members were kept very busy. According to one who served as an assistant surgeon in the field, their service

> . . . consisted chiefly of the application of plaster and bandages and the administration of stimulants, and superintending the placing of the badly wounded in the ambulances for transportation to the field hospital. No elaborate surgical procedure was undertaken unless there was urgent necessity for it. Sometimes a very extended area was fought over, and wounded men, both our own and the enemy's, would be scattered about it, often, if the country was wooded or otherwise difficult, in out-of-the way places, whither they had wandered. When the battle was ended, if our troops had possession of the field, we had to hunt up these unfortunates—a duty willingly performed, though not infrequently an arduous one.[47]

It was especially arduous when the woods caught on fire as occurred during the battles of Chancellorsville and the Wilderness. A vivid picture of the former's aftermath was related as follows by a participant:

> . . . On the left side of our line . . . the scene beggars description. The dead and badly wounded from both sides were lying where they fell. The woods, taking fire that night from the shells, burnt rapidly and roasted the wounded men alive. As we went to bury them we could see where they had tried to keep the fire from them by scratching the leaves away as far as they could reach. But it availed not; they were burnt to a crisp. The only way we could tell to which army they belonged was by turning them over and examining their clothing where they lay close to the ground.[48]

At the Wilderness the infirmary corps was seriously impeded in its work by the flames and smoke; undoubtedly many wounded men there were cremated also as a result.[49]

Members of the infirmary corps were forbidden to engage in any action which was not strictly in the line of duty; the medical officer was specifically enjoined not to devote his exclusive attention to a wounded officer or leave his post to escort him

to the rear. Troops other than the infirmary corps were not permitted to break ranks to care for the wounded or remove them from the field; those who did were liable to receive harsh punishment.[50] Field commanders were always proud when they could boast in their battle reports that "no soldier left the field unauthorized."[51]

THE FIELD INFIRMARY DURING BATTLE

While the assistant surgeons were occupied in attending the wounded on the field, the surgeons remained at the brigade or division infirmaries and administered to those whom the ambulances or litter carriers brought in. Their ministrations consisted of performing all necessary surgical operations, seeing that proper nourishment in sufficient quantities was provided by the cooks, and directing the movement of the disabled from the infirmaries to the general hospitals.[52]

Amputations and other surgical operations were supposed to be performed at the field infirmaries with the least possible delay, and this procedure was usually followed.[53] The Surgeon-General, in an effort to increase the strength of the field operating staff, directed, early in 1864, that a Reserve Surgical Corps be organized by medical directors of hospitals for temporary field duty during emergencies. Medical directors were to appoint surgeons to the reserve corps on the basis of one for every five hundred beds in their departments. Those appointed to the corps were to be skillful in the use of the knife, and field medical directors were authorized to request their services whenever they were needed.[54] Lafayette Guild's inability to obtain the services of as many members of the reserve corps as he requested during the heavy fighting in the Wilderness (May 5-12, 1864) caused him to express the fear that they were "too anxious to return to their hospitals."[55] Such comments reflect the almost comtemptuous attitude sometimes manifested by field surgeons toward those assigned to general hospitals. "As for the disease to which you refer, as being the chronic condition of the 'Hospital Doctors'," wrote one of the former, "I am satisfied it is *incurable*. I only regret it is not mortal."[56] Surgeon Samuel H. Stout, Medical Director of the General Hospitals of the Army and Department of Tennessee complained bitterly of the field medical officers' lack of confidence in the labors of their fellows in the general hospitals. "Were the same spirit of recrimination manifested toward surgeons in the field by the surgeons in hospitals," he wrote, "few regimental or brigade or division surgeons in this army could do much else than defend themselves against accusations brought almost every day against them by privates in hospitals."[57]

The scenes in and around field hospitals during an engagement were quite grim. One soldier who visited a field hospital

near Atlanta during the summer of 1864 remembered years later the sight of a large pile of arms and legs in the rear of the building and stated that there was nothing in his whole life that he remembered with "more horror than that pile of legs and arms that had been cut off our soldiers."[58] He concluded his comments on the hospital as follows:

> It was the only field hospital that I saw during the whole war, and I have no desire to see another. Those hollow-eyed and sunken-cheeked sufferers, shot in every conceivable part of the body; some shrieking, and calling upon their mothers; some laughing the hard, cackling laugh of the sufferer without hope, and some cursing like troopers, and some writhing and groaning as their wounds were being bandaged and dressed. I saw a man . . . who had lost his right hand, another his leg, then another whose head was laid open, and I could see his brain thump, and another with his under jaw shot off; in fact, wounded in every manner possible.[59]

To make matters more difficult, hospitals sometimes were caught in the line of fire and both surgeons and patients were killed.[60]

The dead, of course, were buried as soon as possible after a battle by burial parties from the opposing armies. A short truce was usually agreed upon after an engagement to enable the armies to recover the bodies, and their interment, in common graves dug for the dead of each army, took place immediately. General Lee, according to Lafayette Guild, readily gave his consent to the removal of enemy dead because "he did not want a single Yankee to remain on our soil *dead or alive*."[61] The offensive odor of dead around the works at Vicksburg and other besieged garrisons created a sanitary problem, and it was sometimes reported that, without a formal truce, Federal skirmishers fired on burial parties.[62] Occasionally, when the army was forced to withdraw after a battle, the dead were left on the field.[63]

MOVEMENT TO GENERAL HOSPITALS: THE AMBULANCE PROBLEM

After the wounded had received the necessary attention at the field hospitals, the surgeons were responsible for directing the removal of those who had undergone operations, and were able to stand further movement, to the general hospital.[64] Ambulances and every other means of wagon transportation were used to transport the wounded to railroad depots, steamer landings, and sometimes the entire distance to the interior institutions. This movement was often handicapped seriously by the lack of a sufficient number of ambulances and animals to draw them, two of the truly serious shortages experienced by medical officers of the Southern Confederacy.

Lafayette Guild could report, even after the bloody battles of the Wilderness and Spotsylvania (May, 1864), that there was no suffering among the men from the lack of medical supplies or surgical attention.[65] And an abundance of medical stores and officers was reported at other times by inspectors and high ranking surgeons in the field.[66] Never, however, did the armies appear to have an adequate amount of ambulance transportation, and in April, 1863, Guild reported that one of the two most serious problems confronting the Army of Northern Virginia as a whole was that of transportation.[67] The lack of ambulances sometimes made it necessary for Guild to keep his wounded in the field;[68] and he complained that the wagons he had were made of inferior materials whereas "the horses appear to have been broken down before turned over to the ambulance train."[69] Guild believed that each regiment should have two ambulances and that an additional number should be held in reserve for each corps and the whole army.[70] He was unable ever to procure a sufficient number, however, and continued to complain of the ambulance trains' "wretched conditions."[71] In June, 1863, when Lee's forces invaded Pennsylvania, spring wagons were impressed so that the sick could be carried forward with the army.[72]

The shortage of ambulance transportation was felt throughout the Confederacy. Thomas Williams, Medical Director of the Army of the Potomac, wrote of the need for ambulances in his army, asserted that poor materials were being used in those that were furnished, and asked that the War Department adopt regulations necessary to prevent the use of hospital wagons for ordinary regimental purposes.[73] When the special congressional committee appointed to investigate the Medical Department completed its inquiry early in 1862, it asserted that the lack of medical wagons had "produced much of the mortality and much of the suffering."[74] A year later, inspecting officers reported only 38 ambulances in the Army of Mississippi,[75] the Army of Tennessee's medical director informed Surgeon-General Moore that his army had received "an inadequate supply"[76] and Lieutenant-Colonel E. J. Harvie, Assistant Inspector-General in the Army of Mississippi, adverted to the need for surgical instruments in that army but emphasized quite clearly that "ambulances, particularly are required and ought if possible to be supplied."[77]

Transportation facilities confronting medical personnel in the Army of Tennessee became increasingly serious, and early in 1864 its medical director warned "that not half the necessary supplies can be carried and those who are so unfortunate as to be sick or wounded on a march, will have to be left by the roadside."[78] In the summer of that year, Medical Inspector Edward N. Covey found the ambulance transportation of Medical Director

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Stout's department to be "entirely insufficient."[79] And in 1865, entire brigades in the Department of Western Virginia and East Tennessee were found to be without ambulances or medical wagons of any kind.[80] Priorities assigned to the use of wagons for purposes of forage and the movement of subsistence stores during the closing weeks of the war made the problem of transporting medical and hospital supplies almost insoluble.[81]

The wounded usually underwent a most uncomfortable trip even when ambulance transportation was available to move them from the field hospitals. Some spring vehicles were supplied early in the war, but when these broke down they were replaced by ordinary wagons,[82] and as the latter moved over rough, wooded country or on roads rutted by artillery and army supply trains the occupants experienced a rude jolting. Heavy downpours sometimes caused wagons to become mired in the mud, while, at the same time, the wounded were drenched by the rain falling through leaky covers.[83] Drivers were not always considerate of their charges, and one officer related that he was compelled to draw his pistol on one to stop him from traveling at breakneck speed over the roughest roads.[84]

Ambulance wagons might also be harassed by the enemy. Two ambulance trains headed south after the battle of Gettysburg were both, according to Lafayette Guild, attacked by enemy raiding parties. The raiders, he asserted, "destroyed many wagons," "paroled the wounded private soldiers," and took with them "all of the officers who fell into their hands."[85] When the Gettysburg wounded reached Williamsport, they were moved across the swollen Potomac on rafts and ferry boats; an ambulance line was then organized to Staunton which made connections with the Richmond trains. Not all, however, were removed to the capital. Many convalesced in the Valley hospitals.[86]

Field medical officers of the Army of Northern Virginia were aided to a considerable extent in the removal of their wounded to the general hospitals by an organization known as the Richmond Ambulance Committee. Established in the capital during the spring of 1862, it was composed for the most part of men exempt from military duty and had an over-all membership of nearly a 100 well-known citizens. Headed by John Enders, the committee formed itself into a military company and attempted, at its own expense, to attend, feed, and transport the wounded to the interior hospitals.[87] At the battle of Williamsburg (May 5, 1862), the organization had 39 ambulances on the field, and it functioned effectively in almost every engagement participated in by Lee's army. Seven thousand men passed through the committee's hands at Chancellorsville (May 2, 1863), and after the battle of Gettysburg, a Richmond newspaper reported that

> . . . the Ambulance Corps was in Winchester for the entire period of three weeks, at the expense of many thousands of dollars to its individual members, caring for the wounded, facilitating their transportation, and doing all possible offices of humanity.[88]

Coordination existed between the Ambulance Committee and the medical directors of the Virginia general hospitals and the Army of Northern Virginia.[89] Lafayette Guild and General Lee both acknowledged publicly the great obligations they were under to the committee for its valuable and humane services.[90]

TRANSPORTATION OF THE WOUNDED BY RAIL

As a general rule, ambulance transportation was used only to remove the wounded to nearby railroad and water connections. A good many disabled soldiers reached the Richmond hospitals in ambulances or on steamers from Drewry's Bluff, but most wounded throughout the Confederacy were transported by rail. In the decade preceding the war the Southern states had been quite active in railroad construction, and by 1860 Virginia and Georgia ranked sixth and seventh, respectively, among all the states in railroad mileage. The enterprise shown by these two states was fortunate for the Confederacy in moving its disabled troops since their strategic location caused a large share of the burden to fall upon their lines.[91]

The movement by rail was at times a most disagreeable experience for the wounded and a trying one for medical officials. After the battle of Chancellorsville, for example, Union cavalry tore up the railroad tracks in the Confederate rear and occasioned a delay of several days in the transportation of the disabled to Richmond.[92] Unheated cars in winter also caused suffering; the wounds of a group that reached Richmond late in November, 1863, on an unheated ambulance train were almost frozen, and the Ambulance Committee "built a fire on the track" to relieve the intense suffering.[93] It was not unusual for trains to jump the track, and the wounded often died or received additional injuries in such wrecks. A Texan who was wrecked en route to the Stout Hospital in Milledgeville, Georgia, wrote: "I went all through the Tennessee campaign, and I tell you that I saw some hard times, and then to get nearly killed on an old car, is rather disheartening."[94] Inspectors complained also of lack of water in the cars and the tendency of engineers to jerk the cars in starting their trains. "Another evil," wrote an inspector late in 1863, "is in the frequent and most unreasonable delays of trains loaded with sick and wounded; in the present crowded and confused condition of transportation, it is doubtful whether we can effect any removal of this difficulty."[95] Such delays were indeed unavoidable, and a surgeon of the Mississippi Blind Asylum Hospital in Jackson noted that some of the wounded received there were almost "in articulo mortis" when they

arrived.[96] Medical Director A. J. Foard of the Army of Tennessee held General Leonidas Polk responsible for much of the suffering borne by the disabled sent back from Murfreesboro because Polk would not allow them to stop at Chattanooga, and Foard spoke of that officer as being "very obstinate."[97]

CHICKAMAUGA

The problems involved in the large-scale movement of wounded men to the general hospitals and the utter impossibility under certain circumstances of preventing much tragic suffering and very many deaths may perhaps best be illustrated by the efforts of the medical officers to care for the Chickamauga wounded. In the first place, the wounded had to be moved from 10 to 25 miles over bad roads from the battlefield to the railroad. Rail transportation was at first deficient, and it was reported five days after the battle that there were still 20 carloads of men waiting to be moved. In the meantime, Medical Director Stout had lost contact with the medical director of the Army of Tennessee, but, learning where the wounded were being concentrated along the railroad, he repaired from Marietta to that point with additional medical officers and hospital attendants to supervise the further care and disposition of the wounded. Other hospital surgeons were sent to the field, and they were replaced by private physicians, many of whom volunteered their services to the government during the emergency. After Stout arrived on the scene, he found it necessary to open hospitals at Dalton and Ringgold and to reopen the Tunnel Hill institution; these points were located approximately 14, 8, and 12 miles, respectively, from the area where the wounded were concentrated and were primarily receiving and distributing centers for the patients. Since the hospitals in Stout's department had a capacity of only about 7,500 beds it was necessary to send large numbers of the wounded to other departments; many were assigned to the care of private citizens residing near the hospitals, and furloughs were granted to those who would be disabled for more than 30 days but who did not require skilled surgical attention. The slightly wounded were sent to convalescent camps, and malingerers were returned to their commands. Unfortunately, however, chiefly because of the rail situation, most of the wounded, regardless of ultimate destination, had to be sent to Atlanta. According to Surgeon J. P. Logan, medical officer in charge of the Atlanta hospitals, more than 10,000 soldiers were received into the hospitals of Atlanta during September alone whereas the capacity of those institutions was not more than 1800. To make matters worse, the hospitals below Atlanta were just in the process of being re-opened after their removal from the Chattanooga area. Both Logan and Stout were of the opinion that the medical officials had done well under the circumstances, but the latter communicated to Surgeon-General Moore his need

for increased hospital accommodations and more qualified medical officers.[98]

Ordinarily the movement of the disabled to general hospitals took place with much more facility. Almost 5000 wounded men, for example, were received into the Richmond hospitals between May 6 and May 20, 1864, and the total number of deaths during that interval of time was reported as exactly 73. Of this number, it was revealed, 10 were dead upon arrival, 17 died within an hour after their reception, and 14 died within six or seven hours after admission.[99] The reception of wounded from the Army of Northern Virginia at Richmond was superintended by Francis W. Hancock, surgeon in charge of Jackson Hospital, and a military guard stood by to prevent any interference with the men. Only Surgeon Hancock, his immediate aides, and the Ambulance Committee were authorized to attend the disabled.[100]

PROBLEMS OF COORDINATION

Two important factors that seriously handicapped the Medical Department in removing the sick and wounded to the rear before, during, and after engagements should be noticed. The first of these concerned a lack of proper staff cooperation between the Medical, Subsistence, and Quartermaster Departments. The second was the failure of the military arm to advise the Medical Department of troop movements.

Surgeon-General Moore, in an effort to solve the problem of insufficient staff coordination, proposed to the heads of the Subsistence and Quartermaster Departments in November, 1863, that special commissary and quartermaster officers, subordinate only to their seniors in Richmond, be appointed solely for the purpose of supplying the needs of the sick and wounded. It was Moore's contention that during active operations the duties of the chief commissary and quartermaster officers were so onerous and the lines of communication with their juniors were broken so frequently that proper services simply were not afforded medical officers. No response appears to have been forthcoming, and, late in January, 1864, the Surgeon-General appealed to field commanders themselves to perfect the best arrangement possible and enclosed his own proposition for their information.[101] No comprehensive plan was adopted, but an arrangement was made in Lee's army near the close of 1863 whereby an assistant commissary in each division gave his entire attention during the battles toward providing subsistence for the sick and wounded.[102]

The medical directors of both the Army of the Potomac and the Army of Northern Virginia complained at times of their inability to make adequate plans for the removal of the disabled because of the commanding general's failure to advise them of

operations. Thomas H. Williams, medical chief of the Army of the Potomac, complained that unless the commander was "less reserved in his official intercourse with this Department, untoward circumstances will prove of frequent recurrence."[103] Lafayette Guild wrote on one occasion that "everything is done hurriedly and mysteriously" and declared that a knowledge of contemplated troop movements "would add greatly to the efficiency of the Corps."[104]

TREATMENT OF ENEMY CAPTIVES

Large numbers of enemy sick and wounded often fell into Confederate hands after engagements, and their treatment was one of the problems of the battlefield. Usually enough Federal medical officers were left to render surgical attention to their troops, but, of course, much supervision and material aid was almost always needed. Many Union troops, for example, were so badly wounded in the terrible battle of Malvern Hill (July 1, 1862) that they could not be removed from the field. General Lee, made aware of their suffering, directed Lafayette Guild to assist the Northern surgeons in concentrating their men at a central position "where surgical aid could be more efficiently rendered and where provisions and other necessaries could be issued."[105] Arrangements were sometimes made which allowed the United States commander to send supplies for his wounded,[106] and it was not unusual, under agreement between the field commanders, for the disabled to be paroled and transferred within the Union lines as speedily as possible.[107] Others were transported to interior hospitals to receive treatment and await parole there. Surgeons of Confederate prison hospitals were ordered, in the spring of 1864,[108] not to transfer any man whose life would be endangered by travel.

Confederate forces were not infrequently charged by the enemy with barbarous conduct in their treatment of Union sick and wounded. Colonel Abel D. Streight, who led a Federal raiding party from Tuscumbia, Alabama, toward Rome, Georgia, in April, 1863, asserted that the Confederates, after taking possession of the hospitals he had established for his wounded, seized the medical stores, instruments, blankets, rations, shoes, coats, hats, and money from the surgeons and left the wounded "in a semi-naked and starving condition."[109] Several charges were made to the effect that Confederate officers refused to grant requests, made under flag of truce, for the removal of Union dead and wounded from the field of battle.[110] Such accusations as were made usually condemned the offenders with violating well-recognized principles of war.[111]

There was undoubtedly some mistreatment and neglect of sick and wounded captives by both Confederate and Union forces. Neither side, at any rate, enjoyed a monopoly of ac-

cusations against the other. Lafayette Guild, for example, held that "the inhuman enemy invariably, when an opportunity offers, drag our sick and wounded officers (at the sacrifice of their lives) into their own lines."[112] Charges and counter-charges notwithstanding, Union officers themselves have testified to many refreshing instances of human attention accorded their disabled by Southern medical officers. John Swinburne, left in charge of the Federal sick and wounded remaining on the field after the "Seven Days" (June 25-July 1, 1862), informed General Lee that the Confederate surgeons had "performed miracles in the way of kind attention both to us surgeons as well as the wounded."[113] A detail of United States surgeons sent within the Southern lines after the battle of Chancellorsville (May 2, 1863) to effect the removal of their men related that the "rebel surgeons . . . treated our wounded with consideration."[114] During the Wilderness campaign some 600 Union troops were rescued from hospitals inside the Confederate lines, and Montgomery C. Meigs, Quartermaster General of the United States, informed the Secretary of War that the men were in "generally good condition" and had been "kindly treated by the enemy."[115] Thomas A. McParlin, medical head of the Union Army of the Potomac, reported, after the battle of Cold Harbor (June 3, 1864), that the Federal wounded collected in Confederate field hospitals received the same amount of food, medical attendance, and medical supplies as the Southern wounded.[116]

The kind of treatment of many Confederate wounded who fell into Union hands on land and sea has also been attested by Southern officers and other observers. When Lee abandoned his positions at Antietam, for example, many wounded were left behind, and the kindness of the doctors in blue to those wounded received wide recognition. Jonathan Letterman, the Union army's medical director, expressed the sentiment of most army medical officers in the following statement: "Humanity teaches us that a wounded and prostrate foe is not then our enemy."[117]

EXCHANGE OF SURGEONS

An extremely significant development pertaining to the status of medical officers captured on the field of battle occurred in the spring of 1862. During the opening campaigns of the war, captive surgeons, in accordance with the practice that had prevailed throughout the world, were held prisoners in the same manner as other officers. Most medical officers, as well as other military personnel, dreaded captivity, and, when their armies were compelled to retreat after an engagement, there was an understandable reluctance on their part to remain with the wounded and face months of confinement in enemy prisons. Their incarceration, generally speaking, meant that many sick and wounded comrades would be deprived of their services over an

indefinite period of time. When Stonewall Jackson, during his Shenandoah Valley campaign of 1862, entered the city of Winchester on May 25, however, a train of events was set in motion that inaugurated a new departure in the annals of war.

A number of Union wounded had been left at Winchester's Union (Hotel) Hospital in charge of J. Burd Peale, a brigade surgeon, and seven other Federal medical officers. General Jackson ordered that Peale and his colleagues be allowed to continue their ministrations undisturbed, and before Jackson's forces withdrew from the city on May 31, an agreement was entered into between the Union surgeons and Hunter Holmes McGuire, medical director of Jackson's army, which freed the former unconditionally, upon their promise to work for the release of the same number of Confederate surgeons. The Union surgeons also agreed to lend their efforts to win support for the principle that all medical officers captured thereafter should be released unconditionally.[118]

The agreement of May 31, 1862, between the Union medical officers and Medical Director McGuire at Winchester was followed by a proposal on June 10, 1862, from General George B. McClellan, Commander of the United States Army of the Potomac, to General Lee, that medical officers "be viewed as noncombatants" and not liable to detention as prisoners of war.[119] General Lee concurred in this proposition on June 17, 1862.[120] Two days later, General McClellan sent General Lee a copy of General Orders No. 60, dated June 6, 1862, issued by the Adjutant General's Office in Washington, paragraph 4 of which reads as follows:

> The principle being recognized that medical officers should not be held as prisoners of war it is hereby directed that all medical officers so held by the United States shall be immediately and unconditionally discharged.[121]

The precise relationship between this directive and the Winchester agreement is not known but certainly an important step in the interests of the sick and wounded of both armies had been taken. Complete harmony on the subject was apparently reached when the Confederate Adjutant and Inspector General's Office published General Orders No. 45 on June 26, 1862, which, like its Northern counterpart, directed the immediate and unconditional discharge of all medical officers in Southern prisons.[122]

Release of medical officers pursuant to the foregoing orders proceeded without interruption until the summer of 1863. At that time the orders were suspended due to ill feeling which developed from the case of Dr. William P. Rucker.[123] Dr. Rucker, a staunch Unionist native of Covington, Virginia, was charged

by the Commonwealth of Virginia with having committed murder and stolen a horse shortly after the outbreak of hostilities. On July 25, 1862, Confederate cavalry forces captured Rucker, who by that time it seems was a surgeon in the Union army, stationed at Summersville, West Virginia. Rucker was then delivered for trial to the state authorities. Robert Ould, the Confederate Agent of Exchange, refused to consider demands for Rucker's release or to concur in a proposal which would have permitted the exchange of all medical officers held by both sides with the exception of Rucker and a hostage held for him by the United States. The dreary controversy over Rucker dragged on until October, 1863, at which time he escaped from the state authorities in Richmond. On November 11, 1863, Ould accepted a Union proposal for the immediate release of all medical officers without reservation,[124] and the free exchange of surgeons was resumed.[125]

Cases continued to arise from time to time of the detention of Confederate medical officers by the United States, and these were sometimes attributed to the "maladministration of subordinate officers."[126] The detention of medical officers for months at a time in such institutions as the Old Capitol Prison in Washington,[127] the Military Prison Hospital in Louisville, Kentucky,[128] and United States Military Prison No. 21 in New Orleans,[129] however, probably could not be blamed altogether on subordinates. And eight Southern surgeons were detained for four months in Chattanooga Hospital No. 2—during which time all of their wounded had been exchanged.[130] Records indicate also that medical officers of the United States were sometimes subjected to undue detention in the Confederacy.[131]

Medical officers on both sides were always anxious for the speedy exchange of all prisoners, and the case for the neutralization of hospitals, their personnel and material was stated by no one any more ably than it was by Surgeon Henry S. Hewit of the United States Medical Department in January, 1865. Hewit, Medical Director of the Army of Ohio, wrote:

> The hospital should, under all circumstances, be held sacred. Surgeons and attendants engaged in their legitimate duties should not be subject to capture, and hospital stores and medicines should have free transit and enjoy freedom from capture or confiscation. The question is of the utmost importance in its most obvious view in saving life and mitigating suffering on the field of battle, and taking away the necessity for sudden and most distressing removals of wounded men according to the exigencies of conflict. . . .It would do more than any measure, either military or political, to realize the desire of every patriot—the restoration of an harmonious Union.[132]

Surely the field surgeon should have been accorded, in the interests of humanity, the utmost consideration. He endured the long marches with the troops and shared their peril on the field of battle. His hospital frequently fell into the line of fire, and, during the din of battle and after, he was called upon to perform hour after hour the most serious operations. The casualties of major battles were so heavy that neither the Confederate surgeon nor his Northern counterpart ever had enough assistance at times, and his labors in behalf of the wounded often continued until he was overcome by exhaustion. Battlefield promotions and other rewards might be won by the fighting man, but there was little likelihood that the field surgeon, regardless of his risk and work, would receive more than passing notice.[133]

REFERENCES AND NOTES

1. *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies,* 127 vols. and index (Washington, 1880-1901), Ser. II, Vol. II, 425: hereafter cited as *Official Record of the Union and Confederate Armies.*

2. *Confederate States Medical and Surgical Journal,* (Richmond, 1864-65), I (September, 1864), 152. Ordinarily, according to General Orders No. 23, February 25, 1863, the senior surgeons of commands entitled to medical directors were detailed as medical directors, but the directive provided that when the interests of the service required, the Surgeon General would recommend medical directors. Robinson, R. H. P. (comp.), *General Orders . . .For the Year 1863 . . .* (Richmond, 1864), 21.

3. *Official Records of the Union and Confederate Armies,* Ser. IV, Vol. I, 1024-1025.

4. *Ibid.,* Vol. II, 56.

5. *Journal of the Congress of the Confederate States of America,* 1861-65, 7 vols. (Washington, 1904-05), I, 370-71; hereafter cited as *Journal of the Congress.*

6. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XI, Pt. 2, 501.

7. *Regulations for the Army of the Confederate States, 1863* (Richmond, 1863) 239-240.

8. *Ibid.,* 240; *Regulations for the Medical Department of the Confederate States Army* (Richmond, 1861-63) 7.

9. Chisolm, J. Julian. *A Manual of Military Surgery,* (Charleston, 1861), 70. See also *Regulations for the Medical Department of the Confederate States Army,* 6; *Regulations for the Army of the Confederate States, 1863,* 238.

10. G. E. Waller to his sister, October 7, 1864, George E. Waller Letters (University of North Carolina Library).

11. Chisolm, *A Manual of Military Surgery loc. cit.* 1, pp. 71-72. Band members sometimes served as nurses. Davis, Nicholas A. *The Campaign from Texas to Maryland* (Richmond, *1863*), 127. A few women went into the field to nurse the disabled, and the Catholic sisterhoods were quite active in this respect. See Hal Tutwiler to "Cousin Netta," September 2, 1861, Tutwiler Papers (University of North Carolina Library); George Barton, *Angels of the Battlefield.* (Philadelphia, 1898, 2nd ed.).

12. *Journal of the Congress,* I, 725.

13. *Regulations for the Army of the Confederate States, 1863,* 239.

14. Chisolm, *A Manual of Military Surgery,* 123-24.

15. Moore, Frank (ed.), *The Rebellion Record . . .,* 11 vols. and supplement (New York, 1861-68), VII, 127.

16. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XLIII, Pt. 1, 142.

17. *Ibid.,* Ser. I, Vol. XLIII, Pt. 2, 1274.

18. Order Book, Headquarters Second Brigade, Second Corps, Army of Northern Virginia, April-October, 1862 (Confederate Museum, Richmond).

19. SGO Circular, May 24, 1864. This item was found in Letters, Orders, and Circulars Sent and Received, Medical Director, Army of Tennessee, 1863-1865. War Department Collection of Confederate Records, Chap. VI, vol. 642 (The National Archives); hereafter cited as WD Coll. of CR.

20. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXXII, Pt. 2, 532.

21. L. Guild to his chief medical officers, August 6, 1864, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1863-1865, WD Coll. of CR, Chap. VI, Vol. 642.

22. *Official Records of the Union and Confederate Navies in the War of Rebellion,* 30 vols. and index (Washington, 1894-1927), Ser. I, Vol. XIV, 691.

23. Benjamin Washington Jones, *Under the Stars and Bars. A History of the Surry Light Artillery* (Richmond, 1909), 78; William J. H. Bellamy Diary, July 15, 1862. (University of North Carolina Library); Diary of Richard Woolfolk Waldrop, August 28, 1863, *ibid.*

24. *Official Records of the Union and Confederate Armies,* Ser. IV, Vol. I, 692-693.

25. Davis, *The Campaign from Texas to Maryland,* II.

26. Chisolm, J. J. *Manual of Military Surgery,* 3-5. Field surgeons were known to have voiced their opposition to orders that might affect the health of the soldiers. One brigade commander was told by his senior surgeon that "We must use prophylactic and hygienic measures to preserve the health of our army, and not attempt to cure men who are made sick by improper management." *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXII, Pt. 2, 1126.

27. Cook, Joel. *The Siege of Richmond . . .* (Philadelphia, 1862), 246-47.

28. Bedford Brown, "Personal Experience in Observing the Results of Good and Bad Sanitation in the Confederate States Army," *The Southern Practitioner* (Nashville, 1879-1918), XV (November, 1893), 448; hereafter cited as "Personal Experience".

29. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXXII, Pt. 2, 530-532.

30. William H. Taylor, *De Quibus* (Richmond, 1908), 316.

31. *Regulations for the Army of the Confederate States, 1863,* 284.

32. Richmond *Examiner,* September 9, 1861. Some regiments were unable to obtain any tents. Samuel Garland to General James Longstreet, August 8, 1861. Letters Received by Surgeon Thomas H. Williams, WD Coll. of CR, Chap. VI, Vol. 369.

33. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XI, Pt. 3, 637. Ailing officers were sometimes quartered in private homes. J. McF. Gaston to his wife, April 13, 1863, James McFadden Gaston Papers (University of North Carolina Library).

34. Hunter Holmes McGuire, one of Lafayette Guild's medical directors, was in agreement with this point of view. See Joseph Jones, "Observations," *Richmond and Louisville* Medical Journal, IX (June, 1870), 640. See also Chisolm, *Manual of Military Surgery,* 71.

35. *Official Records of the Union and Confederate Armies,* Ser. I, Vol., V, 79.

36. Moore to W. A. Carrington, June 26, 1863, Letters, Orders, and Circulars Sent, Surgeon General's Office, WD Coll. of CR, Chap. VI, 740. Hospital tents were fourteen feet wide, fifteen feet long, and eleven feet high; one could accommodate from eight to ten patients. Several tents could be joined together. Chisolm, *Manual of Military Surgery,* p. 67.

37. Burnett, Edmund C. (ed.), "Letters of a Confederate Surgeon: Dr. Abner Embry McGarity, 1862-65", *Georgia Historical Quarterly* (Savannah, 1917-) XXIX (September, 1945), 174, 180-82. Masonic lodges were operating in some camps. *Ibid.,* (December 1945), 227.

38. L. J. Wilson, *The Confederate Soldier* (Fayetteville, Arkansas, 1902), 171.

39. Guild to H. H. McGuire, April 9, 1864, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1863-1865, WD Coll. of CR, Chap. VI, Vol. 642.

40. Guild to S. P. Moore, *ibid.*

41. Scharf, J. Thomas. *History of the Confederate States Navy* (New York, 1887), 311.

42. Many of the wounded of the battle of Chickamauga were sent by rail to Marietta. To make room at Marietta, the sick in hospital there were sent back to Atlanta, and those in the Atlanta hospitals were moved back to La Grange and other points. Atlanta Southern *Confederacy,* quoted in Richmond *Examiner,* September 28, 1863. See also C. H. Tebault, "Hospitals of the Confederacy," *The Southern Practitioner,* XXIV (September, 1902) 499-500.

43. S. H. Stout to S. P. Moore, October 10, 1863, copy, Stout Papers, microfilm Reel IIB (University of North Carolina Library).

44. *SGO Circular,* May 7, 1862, Letters Sent and Letters, Orders, and Circulars Received, General Hospital No. 1, Savannah, Georgia, 1862-1864, WD Coll. of CR, Chap. VI, Vol. 648; Wilson, *The Confederate Soldier,* 104-105. See also J. B. Clifton Diary, *passim,* Archives of the North Carolina Historical Commission.

45. *SGO Circular,* May 7, 1862, WD Coll. of CR, Chap. VI, vol. 648.

46. Ibid. It has been said that Hunter Holmes McGuire, medical director of Stonewall Jackson's commands, "perfected" the ambulance or infirmary corps in the spring 1862.

47. Taylor, *De Quibus,* 330.

48. John O. Casler, *Four Years in the Stonewall Brigade* (Marietta, Georgia, 1951), 151.

49. G. Moxley Sorrel, *Recollections of a Confederate Staff Officer* (New York and Washington, 1905), 251.

50. See, for example, *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XIV, 863; *ibid.,* Vol. XXXVIII, Pt. 4, 672.

51. *Ibid.,* Vol. XI, Pt. 1, 566.

52. *SGO Circular,* May 7, 1862, WD Coll. of CR, Chap. VI, vol. 648.

53. *Ibid.; Official Records of the Union and Confederate Armies,* Ser. I, Vol. X, Pt. 2, 533. The wounded of the battle of First Manassas, instead of receiving surgical attention on the field, were sent to the general hospitals for treatment. Field surgeons were warned against repetition of this procedure. T. H. Williams to corps medical directors, November 13, 1861, Letters Sent by Surgeon Thomas H. Williams, Medical Director, Army of the Potomac, WD Coll. of CR, Chap. VI, Vol. 367.

54. SGO Circular, March 15, 1864, copy, Letters Sent and Letters, Orders, and Circulars Received, General Hospital No. 1, Savannah, Georgia, 1862-1864, WD Coll. of CR, Chap. VI, Vol. 648. W. A. Carrington, medical director of the Virginia hospitals, and Lafayette Guild, medical director of Lee's army, did not see eye to eye on some matters. Carrington proposed early in 1863, for example, that medical officers be detached from field regiments and assigned to hospital service after battles. Guild contended that further engagements would probably occur and that field officers could not be spared. One purpose of the Reserve Surgical Corps' formation was to enable regimental medical officers to remain in the field. Guild to S. P. Moore, May 22, 1863, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, WD Coll. of CR, Chap. VI, Vol. 641.

55. Guild to J. E. Clagett, May 19, 1864, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1863-1865, WD Coll. of CR, Chap. VI, Vol. 642. Guild proposed, early in 1865, that some system of rotation be devised so that all medical officers could have both hospital and field experience. Guild to Moore, January 9, 1865, *ibid.*

56. R. T. Breckinridge to H. H. McGuire, February 1, 1863, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, *ibid.,* Vol. 641.

57. Stout to ?, April 28, 1863, copy, Reel IIB, Stout Papers.

58. Watkins, Sam R. "*Co. Aytch,*" *Maury Grays, First Tennessee Regiment . . .* (Jackson, Tennessee, 1952), 193.

59. *Ibid.*

60. Heartsill, W. W. *Fourteen Hundred and 91 Days in the Confederate Army . . .* (Jackson, Tennessee, 1954), 96.

61. Guild to S. P. Moore, May 22, 1863, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, WD Coll. of CR, Chap. VI, Vol. 641. See also Casler, *Four Years in the Stonewall Brigade,* 89, 140.

62. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXIV, Pt. 1, 89; *ibid.,* Pt. 3, 1002-1003.

63. See, for example, Dr. James E. Green, Diary, July 3, 1863 (University of North Carolina Library).

64. Guild advised the Surgeon General after the battle of Chancellorsville that 132 wounded men were not able to bear movement to the railroad depot. Guild to Moore, May 22, 1863, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, WD Coll. of CR, Chap. VI, vol. 641.

65. Guild to Moore, June 7, 1864, *ibid.*, 1863-1865, Vol. 642.

66. Guild to Moore, April 14, 1863, *ibid.*, 1863-1865, Vol. 641; J. McF. Gaston to his wife, April 16, 1863, James McFadden Gaston Papers; *Official Records of the Union and Confederate Armies*, Ser. I, Vol. XLII, Pt. 2, 1271.

67. Guild to A. H. Cole, April 11, 1863, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, WD Coll. of CR, Chap. VI, Vol. 641. See also J. McF. Gaston to his wife, April 16, 1863, James McFadden Gaston Papers. General regulations allowed each regiment two four-wheeled and two two-wheeled ambulances, but these paper allowances never materialized into actuality. *Regulations for the Army of the Confederate States, 1863*, 284.

68. Guild to Moore, September 6, 1862, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, WD Coll. of CR, Chap. VI, Vol. 641.

69. Guild to Moore, November 22, 1862, *ibid.*

70. Guild to Moore, April 9, 1864, *ibid.*, 1863-1865, Vol. 642.

71. Guild to Moore, May 22, 1863, *ibid.*, 1862-1863, Vol. 641. See also *Official Records of the Union and Confederate Armies*, Ser. I, Vol. XIX, Pt. 2, 660; *ibid.*, Vol. XXV, Pt. 2, 820. There was an ambulance manufactory in Richmond at the foot of 17th Street. Richmond *Daily Enquirer*, November 26, 1863.

72. J. McF. Gaston to his wife, June 27, 1863, James McFadden Gaston Papers.

73. Williams to A. C. Myers, February 8, 1862, Letters Sent, Medical Director's Office, Army of the Potomac, WD Coll. of CR, Chap. VI, Vol. 460; Williams to S. P. Moore, April 17, 1862, *ibid.* See also *Official Records of the Union and Confederate Armies*, Ser. I, Vol. IV, 667.

74. *Journal of the Congress*, I, 725.

75. *Official Records of the Union and Confederate Armies*, Ser. I, Vol. XVII, Pt. 2, 844.

76. E. A. Flewellen to S. P. Moore, July 27, 1863, copy, Letters, Orders, and Circulars Sent and Received, Medical Director, Army of Tennessee, 1863-1865, WD Coll. of CR, Chap. VI, Vol. 748. The shortage of ambulances at Chickamauga delayed the removal of the wounded from the field. Frank M. Dennis to S. H. Stout, October 22, 1863, Stout Papers, Reel IIB.

77. *Official Records of the Union and Confederate Armies*, Ser. I, Vol. XVII, Pt. 2, 844.

78. A. J. Foard to Stout, February 17, 1864, Stout Papers, Reel IIB.

79. E. N. Covey to Stout, July 14, 1864, *ibid.*, Reel IIA.

80. *Official Records of the Union and Confederate Armies*, Ser. 1, Vol. XLIX, Pt. 1, 982. There was also an early ambulance shortage in the Union army. *Ibid.*, Vol. III, 275; George E. Cooper, Medical Director of the United States Army of the Cumberland, averred late in 1864 that "the animals belonging to the ambulance trains have passed over twice as much ground as those of any other train in the army." *Ibid.*, Vol. XXXVIII, Pt. 1, 179. Well-built wagons and strong, perfectly conditioned animals were required for the field service.

81. Guild to S. P. Moore, March 1, 1865, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1863-1865, WD Coll. of CR, Chap. VI, Vol. 642.

82. Miller, Francis T. (ed.), *The Photographic History of the Civil War*, 10 vols. (New York, 1911), VII, 258. See also Chisolm, *Manual of Military Surgery*, 97-98.

83. Dr. Charles C. Gray, Diary, July 31, 1861 (University of North Carolina Library); Dr. James E. Green, Diary, September 8, 1864; *Official Records of the Union and Confederate Armies*, Ser. I, Vol. XIX, Pt. 2, 606; Cook, *The Siege of Richmond*, 36.

84. Beale, George William. *A Lieutenant of Cavalry in Lee's Army* (Boston, 1918), 199.

85. *Official Records of the Union and Confederate Armies*, Ser. I, Vol. XXVII, Pt. 2, 326-327.

86. *Ibid.*, 327. Richmond *Examiner*, July 14, 1863; Burnett (ed.), "Letters of a Confederate Surgeon," *loc. cit.*, XXIX (September, 1945), 162.

87. Richmond *Dispatch*, December 12, 1897, quoted in *Southern Historical Society Papers* (Richmond, 1876-), XXV (1897), 113; Richmond *Daily Enquirer*, September 26, 1863; Joseph T. Durkin (ed.), *John Dooley, Confederate Soldier, His War Journal* (Washington, 1945), 161.

88. Richmond *Examiner*, March 19, 1864.

89. W. A. Carrington to John Enders, April 18, 1864, Letters Sent and Received, Medical Director's Office, Richmond, Virginia, 1864-1865, WD Coll. of CR, Chap. VI, Vol. 364.

90. Guild to S. P. Moore, May 22, 1863, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, *ibid.*, Vol. 641; *Official Records of the Union and Confederate Armies*, Ser. I, Vol. XXVII, Pt. 3, 873. The Ambulance Committee even directed the movement of prisoners at times. Richmond *Examiner*, January 21, 1864.

91. Regular ambulance trains connected Virginia hospital centers throughout the war. General Lee and his medical director preferred the hospitals in Gordonsville, Charlottesville, Lynchburg, Danville, Staunton, and Farmville to those of Richmond, and they insisted that their sick and wounded be sent to those points when possible. See, for example, Guild to S. P. Moore, November 26, 29, 1862, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, WD Coll. of CR, Chap. VI, Vol. 641; Guild to Surgeon Moffatt, June 5, 1863, *ibid.*

92. V. W. Harrison to W. D. Somers, May 14, 1863, William D. Somers Papers (Duke University Library). See also Edward A. Moore, *The Story of a Cannoneer under Stonewall Jackson* (Lynchburg, 1910), 127.

93. Richmond *Examiner*, December 1, 1863.

94. Mrs. S. E. D. Smith, *The Soldier's Friend* . . . (Memphis, 1867), 293-294.

95. S. M. Bemiss to Stout, November 28, 1863, Stout Papers, Reel IIB.

96. W. D. Somers to "friends," September 24, 1862, William D. Somers Papers. General Earl Van Dorn, Commanding General of the Army of West Tennessee at the battle of Corinth, Mississippi (October 3-4, 1862), was charged by a brigade commander, among other things, with having caused great suffering among the wounded in their movement after the battle. Van Dorn, it was asserted, "did allow one or more trains of cars, freighted with wounded soldiers from the battlefield . . . to be detained without any necessity at Water Valley, Mississippi, during one or more entire nights, said wounded soldiers having been herded in said cars at Holly Springs without blankets or nourishment and many with undressed wounds, no surgeon, officer, nurse, or attendant with them. . . ." *Official Records of the Union and Confederate Armies*, Ser. I, Vol. XVII, Pt. 1, 416. A Court of Inquiry, headed by Major General Sterling Price, found Van Dorn innocent of such allegations, however. *Ibid.*, 459.

97. A. J. Foard to Stout, December 12, 1862, Stout Papers, Reel III.

98. Frank M. Dennis to Stout, October 22, 1863, *ibid.*, Reel IIB; Stout to S. P. Moore, October 10, 1863, copy, *ibid;* Wiley M. Baird to Stout, October 22, 1863, *ibid.*, Reel IIA; J. P. Logan to Stout, October 4, 1863, *ibid.;* Logan to Stout, October 24, 1863, *ibid.*, Reel III.

99. Richmond *Examiner*, May 21, 1864. Of 837 wounded received at the Seabrook Hospital in Richmond during a two-day period after the battle of Fredericksburg (December 13, 1862), only one was reported to have died. *Ibid.*, December 16, 1862.

100. "Instructions for the Reception and Transportation of Sick and Wounded from the Army of Northern Virginia," Letters Sent and Received, Medical Director's Office, Richmond, Virginia, 1864-1865, WD Coll. of CR, Chap. VI, Vol. 364.

101. S. P. Moore to Generals Longstreet, Polk, Pickett, Whiting, and Johnston, January 29, 1864, Letters, Orders, and Circulars Sent and Received, Medical Director, Army of Tennessee, 1863-1865, WD Coll. of CR, Chap. VI, Vol. 748.

102. *Ibid.* (enclosure marked "C"). Medical Director Stout advised the Surgeon General that his "chief difficulties in opening, closing & removing hospitals grow out of the want of prompt, active and zealous cooperation on the part of the Q. Masters and Subsistence departments. When hospitals are removed, it is often the case that they are for weeks without aid from these departments." Stout concluded with the statement

that the Medical Department, with all its shortcomings, "can justly claim to be under better discipline and better organized than any of the staff departments of this army." Stout to Moore, October 10, 1863, copy, Stout Papers, Reel IIB.

103. Williams to Moore, April 16, 1862, Letters Sent, Medical Director's Office, Army of the Potomac, WD Coll. of CR, Chap. VI, Vol. 460. See also Williams to T. G. Rhett, April 22, 1862, *Ibid.*

104. Guild to Moore, November 22, 1862, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, *ibid.*, Vol. 641.

105. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XI, Pt. 3, 633. See also *ibid.*, 630.

106. See, for example, *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXV, Pt. 2, 786; *ibid.*, Vol. XXXVI, Pt. 1, 221; *ibid.*, Ser. II, Vol. VIII, 437.

107. Guild to R. H. Chilton, July 26, 1862, Letters Sent, Medical Director's Office, Army of Northern Virginia, 1862-1863, WD Coll. of CR, Chap. VI, Vol. 641. Guild to Chilton, September 9, 1862, *ibid.;* Guild to J. Letterman, May 14, 1863, *ibid.; Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXV, Pt. 2, 447, 786. The transfer of wounded was a humane action. Major General Henry W. Halleck, General-in-Chief of the Union forces, asserted that it was "impossible for our own medical officers after a battle to attend the sick and wounded prisoners, and usually it is impossible for some weeks to hire citizen surgeons for that purpose." *Official Records of the Union and Confederate Armies,* Ser. II, Vol. IV, 102.

108. W. A. Carrington to G. W. Semple, April 12, 1864, Letters Sent and Received, Medical Director's Office, Richmond, Virginia, 1864-1865, WD Coll. of CR, Chap. VI, Vol. 364.

109. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXIII, Pt. 1, 293.

110. *Ibid.*, Vol. XXXV, Pt. 1, 301; *ibid.*, Vol. XL, Pt. 2, 210-211.

111. *Ibid.*, Ser. II, Vol. V, 471; *ibid.*, Vol. VI, 566-569. See also *ibid.*, Ser. I, Vol. XL, Pt. 3, 699.

112. *Ibid.*, Ser. I, Vol. XXVII, Pt. 328.

113. *Ibid.*, Ser. II, Vol. IV, 798. See also Cook, *The Siege of Richmond,* 219.

114. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXV, Pt. 1, 402-403.

115. *Ibid.*, Vol. XXXVI, Pt. 2, 854.

116. *Ibid.*, Pt. 1, 222. See also *ibid.*, Vol. XII, Pt. 1, 708.

117. *Ibid.*, Vol. XIX, Pt. 1, 112. Confederate disabled and their medical officers left at Gettysburg also received much attention from Medical Director Letterman and the United States Sanitary and Christian Commissions. Simon Baruch, one of the Southern surgeons who remained with the wounded, reported that he was given a six-mule wagon loaded to capacity with commissary and medical stores. Baruch, *Reminiscences of a Confederate Surgeon* (New York [?], 1915), 6. See also Baruch, "A Surgeon's Story of Battle and Capture," *Confederate Veteran* (Nashville, 1893-1932) XXII (December, 1914), 546. Such kindness extended to the war on the sea. The wounded of the *Alabama,* famous Confederate cruiser that was sunk by the *Kearsarge* (June 19, 1864), were taken on board the latter vessel for treatment. *Official Records of the Union and Confederate Navies,* Ser. I, Vol. III, 67-70. Admiral Franklin Buchanan, who commanded the Confederate naval forces in the battle of Mobile Bay (August 5, 1864), reported that his captive wounded were carried to the United States Naval Hospital at Pensacola, Florida, and received much consideration. *Ibid.*, Vol. XXI, 578.

118. The initiative in proposing the unconditional release of the Union surgeons seems to have been taken by Hunter McGuire. General Jackson's official campaign report is silent in regard to this important arrangement. See *Official Records of the Union and Confederate Armies,* Ser. II, Vol. IV, 799; Ashburn, "Hunter Holmes McGuire," in *Dictionary of American Biography,* 21 vols. and index (New York, 1928-45), XII, 59; "A Sketch of the Life and Career of Hunter Holmes McGuire, M. D., LL. D., Surgeon, Physician, Teacher, Patriot," *Southern Historical Society Papers,* XXVIII (1900), 273. The written agreement signed at Winchester has not been located, but Philip Adolphus, one of the Union surgeons, made a copy of the document, and this copy was given to the Society of Medical History of Chicago when he died. George H.

Weaver, "Surgeons as Prisoners of War," *Bulletin of the Society of Medical History of Chicago,* IV (January, 1933), 249.

119. *Official Records of the Union and Confederate Armies,* Ser. II, Vol. III, 671.

120. *Ibid.,* Vol. IV, 45.

121. *Ibid.* "Instructions for the government of armies of the United States in the field," issued as General Orders No. 100, dated April 24, 1863, stated in part that the "enemy's chaplains, officers of the medical staff, apothecaries, hospital nurses and servants if they fall into the hands of the American Army are not prisoners of war unless the commander has reasons to retain them." *Ibid.,* Vol. V, 674.

122. *Ibid.,* Vol. IV, 789. Such an order had been issued embracing the Department of Northern Virginia (Lee's command) on June 22, 1862. *Ibid.,* Ser. I, Vol. XI, Pt. 3, 612; *ibid.,* Ser. II, Vol. IV, 784. A Union observer noted that after the new arrangement "many Federal surgeons remained behind, and their services were very much appreciated by the men [left on the field]." Cook, *The Siege of Richmond,* 313-314.

123. See, for further information on the Rucker case, *Official Records of the Union and Confederate Armies,* Ser. II, Vols. IV, V, VI, *passim.*

124. *Ibid.,* Vol. VI, 501.

125. There were, according to a Richmond newspaper, 115 Confederate surgeons exchanged immediately after the accord reached in November. Richmond *Examiner,* November 27, 1863. The same newspaper, sometime earlier, had stated upon the basis of information supplied by "a recent arrival from the North," that there were 65 medical officers confined at Fort McHenry, 26 at Fort Delaware, 4 or 5 at Johnson's Island, and 3 or 4 at Gettysburg. *Ibid.,* October 9, 1863. W. A. Carrington declared that 32 medical officers who remained with the Gettysburg wounded were imprisoned. Carrington to A. W. Whitney, August 19, 1863, Order and Letter Book of the Confederate Medical Director (Confederate Museum). See also Richmond *Daily Enquirer,* September 26, 1863. Nineteen Union surgeons were being held in Libby Prison during July, 1863. *Ibid.,* July 22, 1863.

126. *Official Records of the Union and Confederate Armies,* Ser. II, Vol. VII, 141.

127. *Ibid.,* 481.

128. *Ibid.,* Vol. VIII, 156.

129. Bartlett, Catherine Thom, (ed). *"My Dear Brother": A Confederate Chronicle* (Richmond, 1952), 160-61, 171.

130. *Official Records of the Union and Confederate Armies,* Ser. II, Vol. VII, 853. See, for other cases of unwarranted detention, *ibid.,* 825; *ibid.,* Vol. VIII, 193.

131. See, for example, *Official Records of the Union and Confederate Navies,* Ser. I, Vol. XV, 505; Scharf, *History of the Confederate States Navy,* 649 (footnote).

132. *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XXXVIII, Pt. 2, 536. A resolution offered by Horatio W. Bruce of Kentucky, which instructed the House Committee on the Medical Department to inquire into the feasibility of establishing neutral prison hospitals at the most important prison depots in both the Confederate States and the United States, was adopted by the Confederate House of Representatives on February 5, 1864. Journal of the Congress, VI, 758-759. There the matter rested.

133. For comment by a Confederate surgeon on his work during and after the battle of Chancellorsville, see Burnett (ed.), "Letters of a Confederate Surgeon," *loc. cit.,* XXIX (June, 1945), 104, 108. See also, for an account of enemy shells bursting around a field hospital, *Official Records of the Union and Confederate Armies,* Ser. I, Vol. XI, Pt. 1, 742. A splendid tribute to the Union field surgeon is to be found in Moore (ed.), *The Rebellion Record,* VII, 128. Some surgeons combined military action with their medical duties, and there are quite a few accounts of heroism on the field of battle. Not all were fearless, however. When shells started falling near the *Arkansas,* a Confederate ram, its long, slim surgeon from Mississippi, according to a veteran of the war, could be heard to groan: "Oh Louisa and the babes!" C. W. Read, "Reminiscences of the Confederate States Navy," *Southern Historical Society Papers,* I (May, 1876), 357.

MEDICAL STANDARDS FOR FULL MOBILIZATION

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A REPORT to the President by the Director of the Office of Defense Mobilization, 6 January 1954, states:

Reduction of mental and physical requirements to the lowest possible level consistent with the realistically determined needs of the military services is essential to realization of our maximum national strength . . . . it is evident that there are large numbers of military jobs which can be performed effectively by men having physical or mental deficiencies which now bar them from military service. Arguments are frequently made that . . . utilization of such personnel increases military costs and tends to place on the nation additional long-term costs in veterans' benefits. There is, undoubtedly, some basis for such arguments; however, in time of full mobilization the imperative need for full utilization of manpower becomes a factor of overriding importance. It would, therefore, appear necessary and desirable to experiment systematically prior to full mobilization with utilization of men who do not meet all existing standards.[1]

It is obvious, from the foregoing, that a definite need exists to provide a clear-cut answer to the question, "What is the minimum medical standard which will enable an individual to perform, satisfactorily and effectively, some job in the military service?"

The problem of providing manpower for military mobilization has been delegated by law[2] to the National Selective Service System whose major purpose[3] is to provide a fair and just system of selection in order that the manpower of the nation may be made available for training and service in the Armed Forces in a manner which is consistent with the maintenance of an effective national economy. The Selective Service System process involves registration of all eligible males individually by name, which constitutes the inventory of manpower from which military requirements are drawn; classification of the relative availability of individuals for military service including deferments for essentiality and other reasons; forwarding of the indi-

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viduals to Armed Forces Examining Stations for examination, to determine whether those classified by Selective Service as being available for military service will meet the existing mental, moral, and physical standards; selection for induction of those men who are acceptable and available for military service; and delivery of those eligibles in accordance with the requirements of the Armed Services.

Selective Service local boards furnish a certain prescreening of the individuals eligible for military service prior to forwarding them to the Armed Forces Examining Stations. The purpose of this prescreening is to eliminate registrants with obviously disqualifying defects (*e. g.*, paraplegic individuals, et cetera), as well as those who have been established as morally unfit.[4] The next screening of regular registrants is performed at Armed Forces Examining Stations where moral, mental, and physical acceptability is determined under criteria established by the Armed Forces Examining Station Policy Board.[5] The Armed Forces Examining Station Policy Board established within the Office of the Assistant Secretary of Defense (Manpower, Personnel and Reserve), is composed of the Director of Manpower Utilization, Office of Assistant Secretary of Defense (Manpower, Personnel and Reserve) as Chairman, and one general or flag officer from each of the military services. The Department of the Army[6] is designated under the Armed Forces Examining Station Policy Board as the executive agent for the Department of Defense for the administrative operation and supervision of staffing of Armed Forces Examining Stations. The Surgeon General's Office, Army, has been charged with the responsibility for the complete processing and analysis of the physical examination records of the examinees.

Individuals considered unable to meet the moral standards are those with certain criminal records, those who have had frequent difficulties with law enforcement agencies, or who have exhibited certain antisocial behavior (alcoholism, drug addiction, et cetera), or who have been previously discharged from military service under conditions other than honorable or for the good of the service.[7] Morally unfit individuals are considered disqualified for administrative reasons.

The examinee's mental (intellectual) qualification[8] for military service is determined by the Armed Forces Qualification Test, which is a group of mental tests developed by personnel psychologists from each of the armed services. These tests consist of 100 questions divided into four groups, each of which is divided among items on the meaning of words, arithmetical reasoning, items related to forms and positions, and to test the examinee's mechanical ability. The questions are arranged in a progressive order of difficulty and are given to all regular registrants at Armed Forces Examining Stations by personnel psychologists. During the period 1950 to 1951, the passing

score varied, but since December 1951, the passing percentile score has been 10 points.[2] In 1953 a mental qualification test was developed for Spanish speaking registrants examined in Puerto Rico and covers comparable questions to those in the Armed Forces Qualification Test.[9] Certain procedures have been established for further testing those who failed the mental test. If found qualified on additional testing and personal interview, such persons are considered as "Administrative Acceptees."

Under the Universal Military Training and Service Act of 1951, the Congress provided that the minimum standards of physical acceptability should not be higher than those applied to persons between the ages of 18 to 26 in January 1945.[2] The Department of Defense, shortly thereafter, prescribed that the physical (medical) standards contained in Army Regulations 40-115, as amended, would be utilized in determining physical acceptability by all of the military services.[10] The currently established physical (medical) standards for induction and initial enlistment utilized by the Army, Navy, Air Force, and Marine Corps, are contained in Army Regulation 40-503 (Physical Standards and Physical Profiling for Induction and Enlistment).

In July 1958, the 85th Congress modified Section 4a, paragraph 3, of the Universal Military Training and Service Act, as follows:

> . . . that except in time of war or national emergency declared by the Congress, the standards and requirements fixed by the preceding two provisos (*i. e.*, the passing 10 per cent score on the mental test and the physical standards applied to persons inducted between the ages of 18 to 26 in January 1945) may be modified by The President under such rules and regulations as he may prescribe.

The hearings on this bill advised the Armed Services Committee that if the legislation was enacted into law, prospective inductees with a percentile score of 31 or higher on the Armed Forces Qualification Test (AFQT) would be accepted without further screening but that it was proposed to examine those who made a score of 10-31 with the Army classification battery. This battery of tests is used to identify the preinductee's aptitude for combat, electronics, general maintenance, motor maintenance, clerical, general technical, and radio code. Preinductees who score between 10-31 on the AFQT must score satisfactorily in two or more of these areas or they will be rejected under the new authority. Although the bill as passed gives the authority to raise existing physical standards, the Committee on Armed Services was advised that there was no present intention to raise physical standards.

RESULTS OF PREINDUCTION EXAMINATIONS

A total of 4,699,527[11] preinduction examinations were performed at Armed Forces examining stations from the beginning of the Korean conflict (July 1950) through June 1957. The overall results are presented in table 1.

TABLE 1. *Results of preinduction examination of registrants processed for military service, July 1950 through June 1957*[12]

Registrants	Number	Per cent
Examined	4,986,367	100.0
Found acceptable	3,307,677	66.3
Disqualified	1,678,690	33.7
Medically disqualified only	783,598	15.7
Failed mental test and medically disqualified	154,726	3.1
Failed mental test only	687,355	13.8
Administrative reasons	53,011	1.1

A breakdown of the principal disqualifying defects in terms of broad diagnosis categories among registrants disqualified for medical reasons only, from July 1950 through December 1952[12] is contained in table 2.

TABLE 2. *Per cent distribution of principal disqualifying defects by diagnosis, July 1950 through December 1952**

Diagnosis	Per cent	Diagnosis	Per cent
Total	100.0	Rheumatic fever	0.3
Psychoses	0.7	Heart diseases, organic and valvular	8.1
Psychoneurotic disorders	6.4	Heart diseases, functional	1.2
Mental deficiency	0.2	Hypertensive diseases	4.6
Character-behavior disorders	6.3	Other diseases of the circulatory system	0.9
Epilepsy	1.1	Respiratory system diseases	1.2
Other neurological diseases	1.6	Insufficient serviceable teeth	1.6
Tuberculosis	1.8	Other dental and supporting structure diseases	0.5
Venereal diseases	0.1	Mouth and adnexa diseases	0.0
Other infective and parasitic diseases	1.7	Hernia of abdominal cavity	4.9
Malignant neoplasms	0.1	Other diseases of the digestive system	2.5
Nonmalignant neoplasms	2.1	Genitourinary system and breast diseases	1.3
Neoplasms of lymphatic and hematopoietic tissues	0.0	Skin and cellular tissue diseases	2.2
Other neoplasms	0.1	Arthritis	0.8
Asthma	6.0	Ankylosis	0.4
Other allergic diseases	0.4	Limitation of motion	1.1
Diabetes mellitus	0.8	Musculoskeletal diseases, n. e. c.	5.4
Other endocrine system diseases	0.9	Flatfoot	2.2
Metabolic and nutritional diseases	0.1	Deformities	4.3
Blood and blood forming organ diseases	0.2	Amputations of extremities	0.7
Acuity of vision	4.7	Congenital malformations	4.3
Other eye defects	2.8	Failure to meet height and weight standards	2.5
Acuity of hearing	0.9	Other miscellaneous diseases and defects	4.6
Otitis media, with or without impaired hearing	4.9		
Other diseases of the ear and the mastoid process	0.5		

*From *Medical Statistics of the United States Army*, Annual Report of The Surgeon General, Calendar Year 1953, Office of The Surgeon General, Department of the Army, Washington, D. C., 1955, Table XXXII, p. 89.
The distribution by defect relates to registrants who were disqualified for medical reasons only.

It is apparent, after reviewing the principal disqualifying diagnoses at preinduction (table 2) that there are many persons in the military service who have similar or identical medical conditions and who are being successfully utilized. This is because the military services have different criteria for entry and for retention. The criteria for retention and/or disability separation for Army personnel are contained in Army Regulation 40-504, "Standards of Fitness and Unfitness for Retention on Active Duty."[13] The fact that an individual acquires one or more

physical imperfections while in the military service does not in itself, under this regulation, entitle him to medical separation or retirement. The fact that a person may be entitled to certain compensation from the Veterans Administration after leaving the military service by reason of having acquired a medical defect in line of duty, does not in itself entitle him to medical separation or retirement. The sole criterion for existing retention standards and/or disability retirement is whether or not the patient's physical (medical) condition is such that he can or should continue to serve in the military service.

EXISTING ENTRY STANDARDS

The current philosophy of the military services is that the public interest is best served when physical (medical) standards are maintained at the highest permissible level consistent with the manpower resources of the national economy. If in time of full mobilization, the imperative need for manpower becomes a factor of overriding importance as implied by the report of The Director of Defense Mobilization,[1] a lowering of entry standards to the retention criteria in use at the time might be considered as a means of increasing manpower resources. The question immediately arises from many sources, "Why don't we begin inducting these people now if they are medically capable of performing military service?" Existing entry standards represent a compromise whereby various military risk appraisal factors are balanced against anticipated manpower resources. These entry standards are lower than the medical standards in effect during World War II (after 1942) when over 10,000,000 men were mobilized. The chief military appraisal factors utilized in developing existing entry standards are listed below.

Medical Factors

The medical officer when performing a physical examination on individuals scheduled for entry into the military service considers the anatomic and physiologic alterations and appraises the findings with reference to the individual's ability to perform some military job; he considers the anticipated sick, hospitalization, and death rates, and/or whether aggravation or progression of the medical condition is such as to preclude military service during the individual's anticipated tour of duty. Once the individual has been accepted for military service, the entry medical examination is further utilized to classify the functional capacity so that the individual may be assigned to a job within his capacity, or to assist in the maintenance or improvement of his health. From an actuarial viewpoint, there is no question but that sickness, hospitalization, and possibly death rates would be increased if the military services utilized existing retention criteria in determining acceptability for entry instead of existing entry standards.

Nonmedical Factors

Anticipated pension and compensation claims. The eligibility for compensation and pensions from the Veterans Adminis-

tration[14] and/or disability retirement from the military service is chiefly dependent upon the circumstances under which the disability arose and the character, nature or degree of the disease or injury. It is necessary that the appropriate armed service concerned make a determination of the "line of duty" or service connection for each medical admission. The current liberal interpretation concerning line of duty and service connection is such that almost all diseases and injuries occurring while the individual is in the military service are considered in line of duty, unless the injury, disease, or death (1) was a result of the intentional misconduct or willful neglect of the individual; (2) occurred during a period of unauthorized absence; or (3) was contracted or incurred while neither on active duty nor engaged in authorized training in an active or reserve status, and was not aggravated by military service.

A member of the military is presumed to be in sound physical and mental condition upon entering active service. In order to sustain the presumption that disability is not service connected, it must be shown by substantial evidence that the medical condition was incurred while the individual was not on active duty or engaged in authorized training in an active or reserve status. If this presumption is overcome by "substantial evidence," it is a further presumption that any additional disability resulting from the pre-existing medical condition was caused by service aggravation. Only specific findings of "natural progress" of the pre-existing medical condition, based on well-established medical principles as distinguished from medical judgment, are sufficient to overcome the presumption of service aggravation. The burden of the proof in refutation of these presumptions rests, therefore, primarily on the Government and, more specifically, on the federal medical officer. The accumulation of data by the medical officer to refute these presumptions is frequently difficult or impossible.

In addition to the presumption mentioned above, certain legal interpretations, policies, precedents, and statutes have developed over the years which further liberalize and expand the original concept of "line of duty" which was first employed in statute law in 1799.[15,16] The Veterans Administration does not necessarily honor the "line of duty" determinations made by the military services. Certain medical conditions incurred as long as two to three years after separation are held to be service connected for pension and compensation purposes, *e. g.*, tuberculosis, multiple sclerosis.

It is not possible within the confines of this study to discuss or elaborate further on the many ramifications of present concepts of "line of duty" or service connection. It is postulated, however, that if entry standards were lowered to the present retention criteria, the pension, compensation, and disability retirement burden to the taxpayer would be significantly increased.

Availability for assignment throughout the world under various environmental conditions. It is an existing policy of the Department of the Army that all individuals who are considered qualified for retention in the service are considered qualified for duty in an overseas area to perform a like job to that performed in the Continental United States. Such a policy is just as desirable during a full mobilization as it is at the present time, in order to maintain flexibility of operation and rotation schedules. Persons who have a disability of a nature and degree similar to those which are disqualifying for entry at the preinduction examination would have significant assignment restrictions and would make utilization under such a policy more difficult. It is possible that none of the individuals who barely meet retention criteria could be depended upon to perform combat duties, and they would necessarily have to be used in a support or base role.

Training. Under existing training concepts, most individuals who enter the military service undergo a period of basic training and orientation immediately after entry. Insofar as possible, all persons now in the service are expected to complete this scheduled training except for those portions which they are physically incapable of performing. It is postulated that if entry criteria were further lowered, it would be necessary to maintain multiple training schedules during basic training instead of the single training schedule concept now in force since most of the persons would have an assignment restriction of one type or another.

Attitude of individual. Statements are frequently made that physically handicapped persons have a better work record in civilian industry than do the physically able. There are no adequate statistics to compare the use of the physically handicapped against the physically perfect persons in the military service. It is an observation, however, that the performance record of those who have a physical disability is closely associated with the individual's motivation for military service and/or his will to work. It is frequently observed that the inducted soldier who has a physical disability and is poorly motivated for military service will attempt to use this as a means of avoiding undesirable assignments or, more frequently, of obtaining a discharge from the military service. The military services by effective command leadership and medical support during the early phases of training are often able to change this attitude and salvage a large proportion of such individuals.

It is the intent of this study to analyze the "Report of Medical Examination" (SF 88), on a sample of individuals found medically disqualified at the preinduction examination but who are otherwise morally and mentally acceptable, to determine the percentage who would meet existing medical retention criteria. It is not within the purview of this report to comment on the disqualifications made for moral, mental reasons inasmuch as

the criteria for qualification and/or disqualification are other than medical considerations.

METHODOLOGY

The Medical Statistics Division, Office of The Surgeon General, Department of the Army, receives a copy of the "Report of Medical Examination" (SF 88), and "Record of Induction" (DD Form 47), of every registrant processed at the Armed Forces examining stations whether he is inducted or found disqualified for military service and, in addition, a copy of the "Report of Medical History" (SF 89) of each disqualified registrant. The Department of Physical Standards Research, Walter Reed Army Institute of Research (WRAIR), requested the Medical Statistics Division to furnish them with approximately 1,000 individual records of disqualified registrants, randomly selected from the records received in July 1956, and about the same number of records, so selected, from those received in July 1957.

Of the total number of records furnished to the Department of Physical Standards Research, WRAIR, 871 records were for registrants who were disqualified for medical reasons. The records of each of these medically disqualified individuals were analyzed individually on the basis of entries made on the "Report of Medical Examination" (SF 88) and "Report of Medical History" (SF 89) to see (1) if nonacceptability was in accord with Army Regulations 40-503,[17] and (2) to determine the number who would meet the standards utilized in the Army for retention purposes. Some of the medical information contained on the SF 88, "Report of Medical Examination," was scanty and, in such instances, it was necessary to consider the individual as not meeting retention standards. An analysis of the results is given below.

RESULTS

An analysis of the individual medical records of the 871 cases considered morally and mentally acceptable but medically unacceptable reveals that 478 of the 871 persons (54.9 per cent) would have been found fit for military service if retention standards (AR 40-504) had been utilized in determining medical acceptability at the preinduction examination instead of existing entry standards (AR 40-503). If this percentage would stand up from month to month and year to year, the "medical disqualification" rate which averaged 15.7 per cent from July 1950 through June 1957 might be expected to be lowered to approximately 7.1 per cent. Further, if the percentage salvaged in the sample was applied to the 783,598 medically unacceptable persons for the above period, a manpower savings of approximately 430,000 would be made. However, if this group of persons were inducted, it would increase the percentage of category "C" personnel (1 or more 3's in the physical profile serial) from approximately 10 per cent[18] of those who enter the Army to approximately 20 per cent.

The source of acceptability by major disease groups using retention standards instead of entry standards is contained in table 3.

TABLE 3. *Source of acceptability by major disease groups using retention standards instead of entry standards**

Disease entity	Total medically unacceptable (July 1956-1957 sample) using entry criteria	Total remaining unacceptable (not meeting retention criteria)	Total medically acceptable (July 1956-1957 sample) using retention criteria
1. Conditions of bones, joints and muscles	149	50	99
2. Neuropsychiatric conditions	113	113	-
3. Circulatory system conditions	96	38	58
4. Conditions of eye	80	28	52
5. Gastrointestinal conditions	67	19	48
6. Allergic conditions	63	11	52
7. Failure to meet height-weight criteria	60	13	47
8. Conditions of ear	56	23	33
9. Genitourinary conditions	33	14	19
10. Skin and cellular diseases	26	7	19
11. Respiratory diseases	26	20	6
12. Nonmalignant neoplasms (Pilonidal sinus)	25	5	20
13. Congenital anomalies	25	18	7
14. Neurological diseases	19	14	5
15. Endocrine and metabolic diseases	12	12	-
16. Malignant neoplasms	3	3	-
17. Dental	3	1	2
18. Infectious and parasitic diseases	3	2	1
19. Diseases of blood and blood-forming organs	1	1	-
20. Miscellaneous conditions n. e. c.	11	1	10
Total	871	393	478

*Nonacceptability criteria based on AR 40-503 (existing entry standards)[17] and acceptability criteria based on AR 40-504 (retention standards.[13]

Note: When an individual record listed more than one disqualifying cause, the principal disqualifying defect was utilized for classification purposes. An individual record which indicated disqualifying vision of 20/800 correctible to 20/20 in one eye and 20/200 in the other and a disqualifying neuropsychiatric condition would be classified opposite "Neuropsychiatric conditions" as "remaining unacceptable (not meeting retention criteria)."

DISCUSSION

Detailed discussion and analysis of entry and retention standards as applied to specific disease entities follows.

Conditions of Bones, Joints and Muscles

One hundred and forty-nine persons in the sample were disqualified at the preinduction examination because of conditions of the bones, joints, or muscles. If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503) in determining medical acceptability of the group, 99 of the 149 could reasonably be expected to be advantageously utilized in the military service. A more detailed discussion of the standards and implications involved is given below.

Arthritis. Sixteen of the persons disqualified at preinduction examination were disqualified because of rheumatoid arthritis or arthritis secondary to fractures or to operations in joints. Entry standards (AR 40-503) preclude acceptance of persons who have active or subacute infectious arthritis or rheumatoid arthritis, including Marie-Strümpell type. Arthritis secondary as a residual of fracture or surgical procedure is individually evaluated, based on whether the resulting condition is of such a degree as to interfere with military service. Retention standards (AR 40-504) permit retention if the arthritis is relatively asymptomatic. The person is medically separated for arthritis only when limited function or persistent pain is present and if not correctible by treatment. Ten of the 16 persons disqualified by reason of arthritis were considered to meet retention criteria and capable of performing military service. Each of of these 10 persons had arthritis which was traumatic in origin or secondary to a surgical procedure but was asymptomatic or relatively asymptomatic. The 6 persons who did not meet retention criteria had symptomatic arthritis due to trauma (3 persons), and/or symptomatic rheumatoid arthritis (3 persons).

Ankylosis—limitation of motion. Eleven persons in the sample were disqualified at the preinduction examination because of ankylosis with limitation of motion. The cause was secondary to fracture in all instances. Entry standards (AR 40-503) do not specifically mention ankylosis or limitation of motion as such. These conditions are generally acceptable, however, when the resulting deformity does not or has not interfered with function to a degree sufficient to prevent the person from following a useful vocation in civilian life. Retention standards (AR 40-504) are more specific and specify that members will not be considered for medical separation unless limitation of motion exceeds the measurements listed below.

1. Shoulder
   a. Forward elevation to 90°
   b. Abduction to 90°
2. Elbow
   a. Flexion to 80°
   b. Extension to 120°

3. Hip
   a. Flexion 90°
   b. Extension 10° (beyond 180°)

4. Knee
   a. Extension to 170°
   b. Flexion to 90°

5. Ankle
   a. Dorsiflexion to 80°
   b. Plantar flexion to 100°

6. Wrist. Less than a total of 15° extension plus flexion.

7. Hand. Pronation to the first quarter of the normal arc.

Using the retention criteria listed above, it was determined that 6 of the 11 persons would meet retention criteria and could reasonably be expected to be utilized in some type of assignment. Assignment limitations would be indicated for all persons.

Musculoskeletal. Thirty-nine persons in the sample were disqualified because of musculoskeletal deformities. Thirteen of these persons had residuals of poliomyelitis, and 10 had a low back syndrome. The others were secondary to birth injuries or trauma. Entry standards (AR 40-503) preclude acceptance of persons who have muscle paralysis or contracture which disturbs function to the degree of interference with military service; pain in lower back or leg which is intractable and disabling to the degree of interference with the function of walking and weight-bearing power. Retention standards (AR 40-504) state that persons who have sacroiliac strain, chronic, mild, will be retained in the service; persons with residuals of poliomyelitis and/or peripheral nerve injury are evaluated on an individual basis consistent with permanence of recovery and residual functional disability. An analysis of the 39 persons so disqualified indicated that 21 of the 39 could reasonably be expected to perform military service with assignment limitations.

Flatfoot. Ten persons in the sample were disqualified for pes planus. Entry standards (AR 40-503) preclude acceptance of persons with pronounced cases of flatfoot accompanied by decided eversion of the foot and marked bulging of the inner border due to inward rotation of the astragalus, whether symptomatic or asymptomatic. Retention standards (AR 40-504) permit retention of practically all persons with pes planus. Assignment limitation is indicated in some cases. Analysis of the 10 cases in which individuals were disqualified indicated that 7 of the 10 persons could be expected to be advantageously utilized in the military service.

Deformities. Seventy-one persons in the sample were disqualified at the preinduction medical examination for miscellaneous deformities of the upper and lower extremities and the back. Most of these conditions are residuals of trauma with 23

instances involving the knee. Entry standards (AR 40-503) preclude acceptance of those with the following conditions: old ununited fractures which significantly interfere with function; old unreduced or recently recurring dislocations of any of the major joints; any disease of the hip, knee, or ankle joint, which interferes with function and weight-bearing power; an unstable or internally deranged joint which causes disabling pain or seriously limits function; history of surgical correction of dislocated semilunar cartilage, or loose bodies of the knee for one year; knee ligaments not stable in the lateral and anteroposterior directions in comparison with the normal knee; a pathological condition shown by x-ray; weakness or atrophy of the thigh musculature in comparison with the normal side; less than full active motion in flexion and extension or other symptoms of internal derangement; deformities due to fracture or other injury which seriously interfere with function and weight-bearing power; active or recently recurring osteomyelitis of any bone, or a substantiated history of osteomyelitis of any of the long bones of the extremities at any time, unless successfully treated two or more years previously.

Retention standards (AR 40-504) permit evaluation of deformities on an individual basis and most persons are retainable with or without assignment limitations. Recurrent dislocations of large joints are generally considered retainable as they are remediable by surgery. A history of osteomyelitis, *per se,* is usually not considered to render a person unfit for retention. Unstable major joints may render the person unfit if symptomatic and not correctible by treatment. An individual analysis of the cases of this group, utilizing retention standards, indicated that 53 of the 71 persons would meet retention standards but most would have some assignment limitations (*e. g.*, those with knee disorders would have to forego long marches and active vigorous sports programs).

Amputations. Two persons in the sample were disqualified at the preinduction medical examination because of amputation of fingers in excess of entry standards. If retention standards had been utilized in determining acceptability for military service both persons could be utilized. However, they probably would have difficulty firing a rifle or performing the manual of arms.

Neuropsychiatric Conditions

One hundred and thirteen persons in the sample were disqualified at the preinduction medical examination because of neuropsychiatric conditions. Breakdown of this group is as follows: 7 with psychosis or documented history of treatment for psychosis within 5 years; 26 with psychoneuroses; 69 with character behavior disorders; 2 with mental deficiency (unable to take AFQT), and 7 with miscellaneous neuropsychiatric conditions.

Entry standards (AR 40-503) permit acceptance of all persons with neuropsychiatric conditions that have not materially in-

capacitated them in civilian life, except for persons who have an authenticated recent history of psychosis. Under this policy, if the person has acceptable mental requirements and has made a reasonable adjustment in civilian life as manifested by ability to get along tolerably with family, friends, casual acquaintances, authorities in school or society, employers, and fellow workers; maintains a conventional attitude toward sexual problems; has sufficient stability and ability to obtain and keep, or at least seek a job, he will be given the opportunity for a trial of military service. While some of the persons accepted in terms of the above criteria have to be subsequently separated for medical or administrative reasons, a significant percentage of those inducted under these criteria make a satisfactory adjustment within the military service and prove that the policy is realistic.

Retention standards provide that psychoneurosis, if persistent and severe, may be considered to cause medical unfitness, provided the neurotic symptomatology is the basic reason rather than weakness of motivation and/or underlying personality disorder. Psychosis or recent history of psychosis is usually considered to render the individual unfit for further military service. Character and behavior disorders are not considered a cause for medical unfitness but may be the basis for administrative separation. This group of cases, therefore, represents a situation where the entry standards and retention standards are essentially the same. For this reason, an analysis of the 113 cases in the group did not reveal any persons who had been improperly classified at the preinduction medical examination, and further significant manpower gains from this group cannot be expected.

Circulatory System Diseases

Ninety-six persons in the sample were disqualified at preinduction examination because of circulatory system diseases. If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503) in determining medical acceptability of the group, 58 of the 96 persons would have been found physically qualified for military service. A more detailed discussion of the standards and implications involved is given below.

Heart disease, organic and valvular. Thirty-seven persons in the sample were disqualified by reason of organic and/or valvular heart disease. This does not include persons disqualified for congenital heart conditions which are reported under congenital malformations. Entry physical standards (AR 40-503) preclude acceptance of persons who have acute rheumatic fever or verified history of a single attack within the previous two years or recurrent attacks of rheumatic fever at any time; valvular heart disease; documented angina pectoris; authenticated history of coronary thrombosis and/or myocardial infarction; circulatory failure manifested by definite symptoms and/or evi-

dence of congestive failure; hypertrophy and/or dilatation of the heart.

It is the intent of these entry standards to exclude from active military service any person affected with disease of the heart which impairs his ability to undergo severe bodily exertion. Many men with compensated heart disease are able to undergo severe bodily exertion, but the question of aggravation by military service, especially by activation of rheumatic carditis is likely to arise and, incidentally, to create compensation and pension problems. Therefore, under existing entry standards, all individuals with valvular heart disease are rejected for military service. From an actuarial standpoint, these standards are realistic and in accord with the policy followed by most insurance appraisers.

Retention standards (AR 40-504) permit retention of persons who acquire valvular heart disease in the military service if asymptomatic. Those with symptomatic heart disease are usually separated through medical channels. As a general policy, those who have a documented symptomatic acute myocardial infarction usually are not retained in the military service for unrestricted military duty.

Exceptions to this policy are made dependent upon the absence of significant complications and residual findings and the desire of the person to return to duty after being properly informed of the hazards of prognosis. Those who have no history of cardiac symptoms and/or positive physical signs, past or present, but who, during the course of a routine physical examination, exhibit an abnormal electrocardiogram consistent with the residuals of a healed myocardial infarction are generally continued in the military service. If subsequent study and follow-up evaluation reveals further cardiac deterioration on the electrocardiogram or other positive symptoms or findings of coronary or myocardial insufficiency, the person usually will be medically separated even though there has never been a positive history or documented findings of an acute myocardial infarction.

Asymptomatic persons whose only finding consists of abnormalities demonstrated by the electrocardiogram, such as low voltage or negativity of the T waves, or an abnormal response in the postexercise electrocardiogram (positive Master's tests), are usually retained in the service as a general policy inasmuch as the determining criterion for retention is the presence or absence of clinical coronary insufficiency of such severity as to produce disability.

The cause of 23 of the murmurs was reported to be rheumatic in origin. In the remainder the cause could not be determined. The appraisal of a heart murmur based on the recorded impression of unknown medical examiners on the report of preinduction medical examination, in these instances, was extremely difficult, and further evaluation by qualified cardiol-

ogists would certainly be indicated prior to making a determination of acceptance for military service. Analysis of the disqualifications within these limitations indicated that 18 of the 37 individuals disqualified met retention standards and could reasonably be expected to be utilized in the military service with or without assignment considerations. All the persons who were considered to meet retention standards were asymptomatic. Many of the persons did not know that they had a heart murmur prior to the preinduction examination. None of the group had any evidence of associated hypertension or cardiomegaly. It is doubtful if any of these persons would be accepted by insurance medical appraisers. It is postulated that the majority of the group could perform military service without aggravation over and above that which would occur to them if they had continued in civilian life.

Hypertension. Fifty-one persons in the sample were disqualified at the preinduction examination by reason of hypertension. Entry physical standards (AR 40-503) preclude acceptance of individuals who have persistent blood pressure at rest above 150 mm Hg systolic or above 90 mm Hg diastolic. Elevation of blood pressure from excitement proved to be temporary in nature is acceptable. Retention standards (AR 40-504) provide that persons with a variable blood pressure of 150-180 and 100-110 (early or mild hypertension) occasionally elevated above these limits under stress but almost always falling to near normal (140/90) with rest, sedatives, or antihypertensive drugs, with no changes or minimal changes in the fundi and/or minimal or no changes in the heart and kidneys, will be considered qualified for retention. Occasionally, an individual will be retained who has higher blood pressure levels which will return to normal limits with rest, sedatives, or antihypertensive drugs. Hypertension associated with radiologic evidence of definite cardiac enlargement, or with a history of cardiac decompensation, or with retinal findings indicative of a malignant hypertension is considered to render the individual unfit for further retention.

Analysis indicated that 35 of the 51 individuals disqualified at preinduction examination did meet retention standards and could reasonably be expected to be utilized in the military service. All of the persons considered to meet retention standards had hypertension of the mild or early type (150 to 180 mm Hg systolic, 90 to 110 mm Hg diastolic), were asymptomatic and there was no recorded evidence of heart, kidney, or fundi changes. Because of the age of this group (under 26 years), it is postulated that most of the persons could reasonably be expected to complete a tour of military service of two to five years without the possibility of incapacitating progression. Progression of signs and symptoms would, no doubt, occur in many instances to the degree that the person would be eligible for Veterans Administration compensation and pension benefits.

Other circulatory system diseases. Eight persons of the sample were disqualified at preinduction examination for other circulatory system diseases: 1 for complete heart block, 1 for frequent premature ventricular beats, 1 for recurrent paroxysmal tachycardia, 3 for simple tachycardia, 1 for varicose veins of a marked degree, and 1 for recurrent thrombophlebitis. Entry standards (AR 40-503) preclude acceptance of individuals who have a pulse rate of 100 or over which is persistent in the recumbent position unless due to psychic reaction or secondary to other diseases when the cause will be the determining factor concerning qualification. Paroxysmal tachycardia, if recurrent and disabling, is disqualifying for entry, as is heart block of a significant degree (a slight increase in the P-R interval of the electrocardiogram in the absence of other evidence of heart disease does not necessarily disqualify for entry); any serious disturbance of rhythm such as auricullar fibrillation is disqualifying. Thrombophlebitis or chronic venous insufficiency resulting from thrombophlebitis of one or more extremities is disqualifying for entry. Other abnormalities of the peripheral vascular system, including large varicose veins, Raynaud's disease, thromboangiitis obliterans, erythromelalgia, and arteriosclerosis, are also disqualifying for entry.

The person who has a cardiac arrhythmia which is present in a mild degree and is discovered at a routine examination, not because of symptoms, is usually retainable especially when the arrhythmia is unaccompanied by any other evidence of cardiovascular abnormality. The person who has an abnormal electrocardiogram with features diagnosable as a bundle branch block as the only objective or subjective finding is ordinarily retainable in the service. Simple tachycardia in itself is seldom a cause for medical separation. The three persons who had a simple tachycardia, the individual with heart block, and the one with premature ventricular beats were considered to meet retention standards.

Recurrent phlebitis, residuals of phlebitis such as persistent edema, ulceration, or claudication which interferes with the performance of acceptable military duty may be a cause for medical separation. Varicose veins usually are not a cause for medical separation inasmuch as a large percentage are remediable by various surgical procedures. When the deep veins are inadequate or when residuals of varicose veins, including recurrent dermatitis or ulceration, symptomatic edema, extensive scarring or pigmentation of the skin, or other physical defects prohibit surgical correction, the individual may be found unfit for retention.

Diseases of the Eye

Eighty persons in the sample were disqualified at the preinduction medical examination because of diseases of the eye.

If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503) in determining medical acceptability of the group, 52 of the 80 persons would have been found acceptable for military service. A more detailed discussion of the standards and implications is listed below.

Visual defects. Fifty persons of the sample were disqualified because of visual defects. Entry standards (AR 40-503) preclude acceptance of persons whose refractive error exceeds 20/400 in each eye without glasses, except that persons who have a minimum vision of 20/400 in each eye without glasses are acceptable if correctible to 20/40 in one eye and 20/70 in the other eye, or 20/30 in one eye and 20/100 in the second eye, or 20/20 in one eye and 20/400 in the second eye, provided the defective vision is not due to active or progressive organic disease. In addition, persons with any degree of defective vision in one eye, from below 20/400 to no light perception, may be accepted provided the defective vision is not due to active or progressive organic disease and the vision in the second eye is not less than 20/100 correctible to 20/20 with glasses. Retention standards (AR 40-504) provide that persons will be retained with any degree of uncorrected vision whenever the eye condition present can be corrected in the better eye to, at least, 20/40 provided the defective vision is not due to active or progressive organic disease.

Analysis indicated that 39 of the 50 persons disqualified for visual defects would meet retention criteria. The defective vision in most instances was due to myopia. Inasmuch as the Veterans Administration[19] does not consider defects of form or structure of the eye of congenital or developmental origin, such as regular astigmatism, myopia (other than malignant or pernicious), hyperopia and presbyopia, as compensable conditions, it seems that this group of conditions represents an area productive of manpower without significant expectancy of increased cost to the taxpayer. Assignment limitations would be indicated in practically all cases.

Other eye conditions. Thirty persons of the sample were disqualified at the preinduction medical examination for miscellaneous eye conditions. Entry physical standards (AR 40-503) preclude acceptance of persons who have loss of one eye or diseases of the eye such as glaucoma, malignant tumor, exophthalmos sufficient to interfere with proper closure of the eyelids and protection of the cornea; diplopia from any cause or of any degree, any tumors of the orbit and abnormal conditions of eyes or visual fields because of diseases of the brain; nystagmus, if true and persistent; permanent and well-marked strabismus (over 20° deviation) or any degree of strabismus if accompanied by diplopia; opacities of the lens, presumably progressive, or dislocation of a lens; acute, chronic,

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or recurrent inflammation of the uveal tract (iris, ciliary body, or choroid), retinitis, uveitis, neuroretinitis, optic neuritis, papilledema, bilateral optic atrophy, pigmentary degeneration of the retina or detachment of the retina, or any other organic disease of the eye not mentioned above which threatens continuity of vision or impairment of visual function.

Retention standards (AR 40-504) permit retention of persons with the following conditions, except as noted: history of detached retina if the retina has become reattached and residual vision is not less than the retention visual standards mentioned above, or the visual field is not damaged so that its greatest diameter is less than 20°; retinitis pigmentosa, unless there are sufficient objective findings in the retina and optic nerve and unless residual visual acuity exceeds retention criteria mentioned above or the visual field is constricted to less than 20° in diameter; cataracts, unless visual loss is in excess of that described above; glaucoma in its incipient stage; vitreous floaters, unless extremely severe and the source of severe asthenopia; nystagmus, macular degeneration, choroiditis, optic neuritis, vitreous hemorrhages, retinal hemorrhages, keratitis, traumatic hole in the macula; keratoconus, unless visual field and vision fall below the limits described above.

Analysis indicated that 13 of the 30 persons disqualified were found to meet retention criteria. The range of miscellaneous eye disease included 8 persons with anophthalmos, associated with trauma, who were fitted with prosthesis; 8 with strabismus exceeding 20°, 3 with cataracts; 1 with dislocated lens; 1 with permanent nystagmus; 1 with reattached retina; 1 with chronic iridocyclitis; 1 with chronic chorioretinitis, and 1 with recurrent corneal ulcer. All of those found to meet retention criteria would require assignment limitations.

Gastrointestinal Disease, Including Hernia of Abdominal Cavity

Sixty-seven persons in the sample were disqualified at preinduction examination because of gastrointestinal disease, including hernia of the abdominal cavity. If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503) in determining medical acceptability of the group, 48 of the 67 would have been found physically qualified for military service. A more detailed discussion of the standards and implications involved is given below.

Hernia of abdominal cavity. Thirty-one persons of the sample were disqualified for inguinal hernia which descended into the scrotum. Entry physical standards (AR 40-503) specify that inguinal hernia which descends into the scrotum, recurrent hernia, postoperative hernia, ventral, and umbilical hernia if moderate or large in size are disqualifying, whereas retention standards (AR 40-504) specify that those with hernias which are considered correctible by surgery will be considered quali-

fied for retention in the military service. Retention standards further specify that individuals who refuse surgery for hernias are to be utilized, if possible, in some military job for which qualified. Two or more recurrences of hernia which occur in the same location require individual consideration based on the degree and extent to which the hernia incapacitates.

Analysis indicated that 29 of the 31 persons disqualified for hernia met retention standards and could reasonably be expected to be utilized in the Army whether operated on or not operated on after induction. If the retention policy concerning hernias were adopted, it is anticipated that a large percentage of the group would accept an operative procedure which would, after appropriate treatment and convalescence, make them available for unrestricted assignment, provided they did not have additional complicating medical conditions. Inducted persons with hernia who would not agree to surgical operation would probably require a truss and/or assignment restrictions.

Implementation of such a policy would create a significant burden on the Armed Forces medical services and would probably cause noneffective time of approximately four to six weeks for each person operated on. It might be desirable to consider authorizing the surgical repair by local physicians or at the nearest Veterans Administration facility for those who would consent to the surgical procedure prior to induction. Such a policy would eliminate the noneffective time had they been operated on within a military hospital and would relieve the burden on medical facilities and resources. It is not anticipated that pension and compensation claims would be significantly increased if persons with hernias were routinely inducted and/or operated on within the military service. This medical condition (hernia of the abdominal cavity) represents, therefore, a segment of manpower that could be advantageously utilized by the military services without assuming too many liabilities.

Peptic ulcer. Twenty-six persons of the sample were disqualified for peptic ulcer (duodenal ulcer) at the preinduction medical examination. Entry physical standards (AR 40-503) preclude acceptance of persons for enlistment or induction if there is an ulcer of the stomach or duodenum as confirmed by usual laboratory procedures, or if there is an authentic history of ulcer of the stomach or duodenum.

Retention standards (AR 40-504) specify that gastric and duodenal ulcer may render the individual unfit, depending on the circumstances. When an ulcer develops while a person is on active duty, the existing policy at most medical installations is to return the individual for a trial of duty when the ulcer heals and there is no roentgenographic evidence of a niche or crater. The ulcer diathesis with simple scarring usually is not considered sufficient in itself to render a person unfit. When

there are documented repeated recurrences of the ulcer and/or when persistent symptoms occur after adequate medical treatment and/or if obstruction, perforation, or bleeding occur, consideration on an individual basis is necessary. Generally, persons with these complications, unless well motivated for service and/or unless the person has good insight into his problem plus understanding of the general nature of ulcer disease, will be found unfit for further service. Analysis indicated that 16 of the 26 persons disqualified because of ulcer would meet the retention criteria listed above.

Peptic ulcer is one of the chief medical causes for prolonged hospitalization in the military service and is a frequent reason for separation from the service. If persons who have a documented history of peptic ulcer are inducted, it is believed that compensation claims filed with the Veterans Administration will be greatly increased, because a significant percentage may reasonably be expected to have one or more occurrences during their tour of military duty. Most ulcer patients in the military and/or civilian life are placed on a rigid or selective type of diet incident to their therapy. It is not practicable within the military service to maintain special diets at all the unit messes where persons who have peptic ulcer will subsist. Some program of education, diet selection, and periodic follow-up such as that suggested by Palmer, Sullivan, and Hamilton,[20] Sullivan and Hamilton,[21] Jastremski and Heffernon,[22] and Wise and associates[23] would be necessary to overcome this deficiency. It is postulated that the medical discharge rate would be increased as would noneffective time for the group as a whole but a significant percentage could probably complete their tour of inducted service if intelligently handled by medical officers, assignment officers, and commanders.

Other gastrointestinal diseases. Ten persons of the sample were disqualified at the preinduction medical examination because of miscellaneous gastrointestinal diseases. Four had evidence of recurrent intestinal obstruction and met neither retention nor entry standards. Two persons were disqualified for ulcerative colitis and one for regional enteritis, and met neither entry nor retention standards. Three of the 10 persons disqualified are considered to meet retention standards; one had mild residuals of cholecystectomy and two were convalescent from acute hepatitis but were expected to show complete recovery and availability for unlimited assignment in two to three months.

Allergic Diseases

Sixty-three persons in the sample were disqualified at preinduction examination because of allergic diseases. If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503) in determining medical acceptability of the

group, 52 of the 63 persons probably would have been found qualified for service with the Army. A more detailed discussion of the standards and implications involved is given below.

Asthma. Sixty persons of the sample were disqualified for asthma. Entry physical standards (AR 40-503) specify that a history of bronchial asthma is disqualifying for entry except for persons who had a childhood asthma with a reliable history of freedom from symptoms since the twelfth birthday. Retention standards (AR 40-504) specify that those with asthma or other allergic diathesis which is mild in nature or, if seasonal or readily controlled by oral medications or by desensitization, are qualified for retention in service. If these retention standards were utilized in medically evaluating the individuals disqualified for asthma, 50 of the 60 persons would have been found qualified for military service. The 50 found meeting retention criteria had asthma of a mild nature, the attacks were infrequent, not causing hospitalization, and were amenable to therapy. If such a group were inducted, it is anticipated that modification of basic training schedules would be necessary for some of the persons inasmuch as the environment encountered during basic training might be expected to precipitate attacks of asthma. It is further anticipated that hospitalization and disability separations among this group would be increased and that pension and compensation claims subsequently would be expected for most of the group under existing eligibility criteria utilized by the Veterans Administration. This group does represent a segment which would be productive of manpower provided the cost to the taxpayer in increased hospital admissions and compensation claims is not considered to be an overriding factor.

Other allergic diseases. Three persons with other allergic diseases (one had a documented allergy to meat, and two had hay fever, severe) were disqualified at the preinduction medical examination. Entry standards (AR 40-503) specify that hay fever, if severe, is unacceptable but mild or moderate hay fever is acceptable. Retention standards (AR 40-504) provide that individuals with hay fever will be retained provided the condition is readily controlled. The two hay fever cases in this instance were under control by medication, appeared to be of a moderate rather than severe degree, and were considered to meet the criteria established for retention.

Failure to Meet Height and Weight Standards

Sixty persons in the sample were disqualified at preinduction examination because of failure to meet height and weight standards. If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503) in determining medical acceptability of the group, 47 of the 60 disqualified persons would have been found physically qualified for military service.

A more detailed discussion of the standards and implications involved is given below.

Obesity. Thirty-eight persons of the sample were disqualified at the preinduction examination because of obesity. The entry standards (AR 40-503) regarding overweight, prior to 27 March 1957, were not rigid but were left essentially to the discretion of the examining medical officer. Under these criteria, if the height-weight relationship was not so excessive as to interfere with military training, the person could be accepted. Changes No. 2, Army Regulation 40-503, 27 March 1957, modified this policy and specified that persons who are 15 per cent or more over the maximum weight outlined in paragraph 13, Army Regulation 40-105, (about 30 per cent over "average" weight) would not be found qualified by medical examiners of Armed Forces examining stations but that the records would be referred to the Army commander for review and for decision regarding acceptability. After the latter policy was placed in effect, the medical rejection rate for obesity increased significantly. Retention standards (para. 13, AR 40-504) rarely consider a person unfit for retention by reason of obesity alone.

Analysis indicated that 30 of the 38 persons disqualified for obesity would meet retention criteria and could reasonably be expected to be advantageously utilized. The significance of obesity in the younger age group is not well established. If, however, the overweight condition is long standing or is in association with such conditions as elevated blood pressure, diabetes, or albuminuria, the morbidity and mortality may be expected to increase as aging progresses.

Underweight. Twenty persons were disqualified at the preinduction examination because of underweight. Entry standards (AR 40-503) specify that the minimum weight for induction is 105 pounds except that the minimum weight for Filipinos, Puerto Ricans, and persons of Oriental descent is 101 pounds. Retention standards (AR 40-504) do not specify any minimum weight. Five of the 20 persons who were disqualified for underweight were Puerto Ricans and one was a professional jockey who intentionally maintained a low weight. If retention standards were utilized in determining qualification for military service, 15 of the 20 disqualified at preinduction examination could be expected to be advantageously utilized. Roentgenograms of the chest of the 15 persons meeting retention standards were without evidence of associated disease.

Height. Two persons in the sample were disqualified by reason of being overheight. Entry standards (AR 40-503) specify that persons below 60 inches in height, or over 78 inches, will not be accepted for military service. Height standards (AR 40-504) are not used as criteria for retention and, in fact, height alone is usually not considered as a medical appraisal factor.

The height-weight relationship, however, is of medical significance. The two persons disqualified had no evidence of disease, the height-weight relationship was satisfactory, and they were considered to meet retention standards.

Diseases of the Ear

Fifty-six persons in the sample were disqualified at the preinduction medical examination for diseases of the ear. If retention standards (AR 40-504) had been utilized in determining medical acceptability of the group, 33 of the 56 persons would have been found qualified for military service. A more detailed discussion of the standards and implications is given below.

Defective hearing. Twenty-five persons in the sample were disqualified because of defective hearing. Entry standards (AR 40-503) preclude acceptance of individuals whose audiometric average loss for each ear exceeds 25 decibels (no loss greater than 30 decibels) at each of the frequencies 500, 1,000, and 2,000 cycles per second and/or over 60 decibels (no loss greater than 70 decibels) at each of the frequencies 4,000 and 8,000 cycles per second. Retention standards (AR 40-504) specify that no Army member will be found unfit for retention on active duty solely because of hearing defect, provided such hearing defect can be improved by the use of a hearing aid to a loss of 20 decibels or less in speech reception score. It was impossible, based on the recorded information on the "Report of Medical Examination," to determine which persons could be benefited by a hearing aid and thus meet retention criteria. Six of the 25 had hearing in one ear of such a degree as to meet retention criteria. It is possible that more individuals in this group could be salvaged, provided detailed hearing evaluation by an otolaryngologist is made.

Otitis media. Thirty-one persons in the sample were disqualified at the preinduction medical examination because of chronic otitis media without hearing loss. Entry standards (AR 40-503) preclude acceptance of individuals at the preinduction medical examination who have acute or chronic suppurative otitis media, chronic catarrhal otitis media, or acute or chronic mastoiditis. Retention standards (AR 40-504) specify that otitis media will not be considered to render a person unfit for retention unless the disease becomes chronic, suppurative, is resistant to treatment, requires frequent hospitalization and is, at least, moderate in severity. Twenty-seven of the 31 persons disqualified at preinduction medical examination are considered to meet retention criteria.

Diseases of the Genitourinary System

Thirty-three persons in the sample were disqualified at the preinduction examination because of diseases of the genitourinary system. If retention standards (AR 40-504) had been

utilized instead of entry standards (AR 40-503) in determining medical acceptability, 19 of the 33 persons disqualified would have been found qualified for military service. A more detailed discussion of the standards and implications involved is given below.

Albuminuria. Twenty-one persons in the sample were disqualified by reason of albuminuria and/or evidence of nephritis, latent or active. Entry standards (AR 40-503) preclude acceptance of persons with evidence of acute or chronic nephritis or persistent albuminuria. Mild albuminuria without casts, which is proved by observation and repeated examination to be temporary in character or orthostatic in type, is not disqualifying. Instructions to medical examiners state that when albumin and/or casts are found in the urine, urinalysis should be repeated not less than twice a day for two or more successive days. If the urine consistently shows albumin and/or casts and is associated with enlargement of the heart, hypertension, and other evidence of cardiovascular-renal disease, the person will be disqualified. If the albumin/casts/blood are not constant and are not associated with evidence of cardiovascular and/or renal disease, decision regarding acceptance is left to the judgment and discretion of the medical examiner. Retention standards (AR 40-504) specify that albuminuria *per se,* will not be considered a reason for medical unfitness. Those with glomerulonephritis of a mild degree are retainable. Analysis indicated that 11 of the 21 individuals disqualified for albuminuria or glomerulonephritis would meet retention standards and could reasonably be expected to be utilized in the military service. Each of the 11 persons determined to meet retention standards had normal blood pressure and was asymptomatic.

Venereal disease. Two persons were disqualified at the preinduction examination for venereal disease, one for acute gonorrhea with doubtful serologic test for syphilis, and one who had a positive serologic test for syphilis. These conditions are not in themselves ordinarily considered as a cause for disqualification for entry and, actually, these individuals should not have been disqualified. They should have been qualified and reported to the local health authorities for treatment and called up for induction when treatment was completed. If treatment was not taken as scheduled, the individual should have been inducted and treated in the military service.

Other genitourinary conditions. Ten persons were disqualified for miscellaneous genitourinary conditions; 2 for hydronephrosis, 1 for hydrocele, 2 for nephrectomy, 1 for symptomatic undescended testicle, 1 for varicocele, 1 for kidney stone, recurrent, 2 for prostatitis. Entry standards (AR 40-503) preclude acceptance of persons with hydronephrosis or pyonephrosis, nephrectomy, undescended testicle which lies in the inguinal

canal when symptomatic, hydrocele if large, varicocele if large or painful, presence of renal calculi, or substantiated history of bilateral renal calculi at any time. No mention is made in entry standards regarding prostatitis other than the generalization that persons with acute pathologic conditions from which, in the natural course of the disease, recovery is expected without sequelae will be found unacceptable until a subsequent examination shows recovery has occurred without disqualifying sequelae. Retention standards (AR 40-504) specify that prostatitis does not render the person unfit for retention, that nephrectomy for traumatic, pyelonephrotic, hydronephrotic, or nonfunctioning kidney or the congenital absence of a kidney will not render the person unfit for retention, provided the remaining kidney is normal; those with varicocele, hydrocele, and undescended testicle lying in inguinal canal are qualified for retention because they are remediable conditions. Renal stones do not usually disqualify for retention if they can be removed unless the person has had previous calculi and both kidneys are involved. Unilateral hydronephrosis is not disqualifying for retention, provided the other kidney is normal. Six of the 10 persons disqualified at preinduction were considered to meet retention standards.

Diseases of Skin and Cellular Tissue

Twenty-six persons in the sample were disqualified at preinduction examination because of diseases of skin and cellular tissue. If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503), 19 of the 26 persons would have been found qualified for military service. Entry standards (AR 40-503) preclude acceptance of those with the following conditions: chronic skin disease, chronic ulcers of the skin, or cured syphilitic lesions which are so severe as to incapacitate the individual for military service and/or so disfiguring as to render him objectionable in common social intercourse; extensive deep or adherent scars which interfere with muscular movements or with wearing of military equipment or which show a tendency to break down; generalized dermatitis of long duration; allergic dermatitis if severe; ringworm infection if very severe and not easily remediable; psoriasis if other than mild; cysts and benign tumors of the skin, and of such size and/or location as to interfere with the normal wearing of military equipment; plantar warts on weight-bearing areas which have materially interfered with following a useful vocation in civilian life; chronic or severe acne, particularly when the face is involved to the extent of being markedly disfiguring, or the shoulders are extensively involved, making them likely to be aggravated by shoulder straps or packs or by wearing other military equipment. Entry standards (AR 40-503) do permit the acceptance of most skin conditions which are mild in nature.

Retention standards (AR 40-504) provide that generally persons may be retained in the military service unless the skin condition is chronic or recurrent, severe and generalized, and requires frequent outpatient treatment or hospitalization. Skin lesions of lupus erythematosus usually are not considered sufficient to render an individual unfit for retention in the military service. Systemic lupus erythematosus usually is considered as sufficient to warrant medical separation. Unsightly disfigurements or skin grafts and cicatrices which, by their size or location, are jeopardized by repeated trauma, occasionally may be a cause for medical separation.

Five of the 26 persons had acute skin conditions (such as abscess, burns, or cellulitis) for which recovery was expected in two to four weeks; 9 had chronic eczematous-type dermatitis; 1 had a severe acne with facial disfigurement; 5 had residuals of burns; 2 had more than mild psoriasis; 1 had extensive taenia pedis; 1 had documented systemic lupus erythematosus; 1 had marked lymphedema of the extremities of unknown cause, and 1 had a plantar wart.

Diseases of the skin and cellular tissue have from year to year ranked high as a cause for admission to medical facilities. If those with more severe diseases of the skin and cellular tissue are inducted, it may reasonably be expected that the load on medical facilities would be proportionately increased. Such conditions in the military service usually are treated on an outpatient basis and the noneffective time in comparison with other disease entities is proportionately low. Most of the persons who are medically separated for skin conditions are separated within the first year of military service and the condition has been considered to have existed prior to entry into the military service. Most of the separations are for chronic eczematous-type dermatitis. Because of the chronicity of the skin conditions and the tendency to recurrences, it is postulated that most of those persons who would be inducted under retention criteria would have recurrences during their tour of military service and would, no doubt, become eligible under existing criteria for compensation after separation.

Respiratory System Diseases

Twenty-six persons in the sample were disqualified at preinduction examination because of diseases of the respiratory system. If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503) in determining medical acceptability of the group, 6 of the 26 would have been found medically qualified for service with the Army. A more detailed discussion of the standards and implications involved is given below.

Tuberculosis. Seventeen persons of the sample were disqualified because of suspected tuberculosis, tuberculosis residuals, or because of inadequate follow-up after treatment. Entry physical standards (AR 40-503) preclude acceptance of anyone with active tuberculosis in any form or location, or of persons who have had active tuberculosis within five years at time of examination. Individuals who acquire active tuberculosis while on active duty may or may not be retained, depending on the circumstances involved and their essentiality. Draftees and nonessential military personnel who acquire active tuberculosis on active duty are usually temporarily retired and transferred to the Veterans Administration for treatment by that organization as soon as a definite diagnosis is made. Such a policy is necessary because of the prolonged loss of service time incident to treatment. Career personnel with severe tuberculosis who cannot be expected to return to duty in 18 months are similarly retired.

Most disability retirements for tuberculosis are made on a temporary basis and the individual is re-evaluated for return to active duty 12 to 18 months after completion of therapy by the Veterans Administration. If the disease remains inactive, removal from the temporary disability retirement list and a return to duty is recommended. Certain essential and career personnel who are held for treatment in Army hospitals as exceptions to the above policy are treated until the disease reaches the inactive stage and a suitable period of convalescence has been achieved, after which the person is returned to a limited-type assignment consistent with his physical capacity. Ordinarily, the disease should be inactive for a minimum of 6 to 12 months before return to duty.

Only three of the 17 persons with suspected tuberculosis had sufficient therapy and follow-up to be utilized at full capacity. Tuberculosis must be inactive and the lesion stable prior to a person's entry into the military service because of danger of transmission of the disease to others and the possibility of relapse. This group as a whole, therefore, is not expected to be fully productive. A detailed medical history and record of treatment should be presented to the examining physician at preinduction in any case of tuberculosis which had been inactive for less than five years in order for him to make an intelligent evaluation of the person's capability to perform military service.

Other diseases of the respiratory system. Nine persons in the sample were disqualified because of miscellaneous diseases of the respiratory system. Two persons of this group were disqualified by reason of bronchiectasis. A person with bronchiectasis in a mild degree is acceptable for retention, as is one with bronchiectasis confined to one lobe because

this is usually correctible by surgery. Bronchiectasis of a degree sufficient to require frequent outpatient treatment or hospitalization usually is cause for medical separation. Both persons presenting themselves for preinduction examination were in this category. One had a pleural effusion of undetermined cause. Although complete medical history in this case was not available on the medical record, the nature of the findings suggested the possibility that it was a manifestation of tuberculosis, and inasmuch as there was active effusion, the individual could not be considered for entry into the military service.

Two persons in the group had infiltrative-type lesions of undetermined cause in the right lower lobe. Although they probably would have been retained under retention standards and operated upon to determine the exact cause, their qualification for military service could not be considered until further follow-up or diagnostic information was available.

One person in the group had a recurring hemoptysis of undetermined cause and it was necessary, for this reason, to eliminate him from consideration of active duty. If facilities for prolonged observation were available to evaluate this case, it might have been possible to determine that the cause was nontuberculous and of no significance, in which case the individual could be considered qualified for military service.

Three persons in the group had evidence of pneumonia and were expected to be qualified for military service within a period of two to three weeks.

Nonmalignant Neoplasms (Pilonidal Sinus)

Twenty-five persons of the sample were disqualified at the preinduction medical examination because of draining pilonidal cyst or sinus. Entry standards (AR 40-503) preclude acceptance of men with pilonidal cyst or sinus which is discharging or which presents a tumor mass. A draining pilonidal cyst or sinus or associated tumor mass, however, even though recurrent, is seldom a cause for medical separation after the person enters the military service because most cases of this type can be effectively treated. Persons who develop infected or draining pilonidal sinus during military service may be expected to produce much noneffective time. In 1954, patients admitted for pilonidal sinus or cyst lost 108,000 days, producing a noneffective rate of 0.21 per cent per 1,000 average strength. On the average, each of these remained 22 days in a hospital or quarters on an excused-from-duty basis. Nonsurgical cases averaged 7 days per admission, whereas surgical cases averaged 30 days per admission. More than 99 per cent of those admitted for pilonidal sinus or cyst were returned to duty with little difference in this respect between those operated on and those not operated on.[25]

Analysis of the 25 persons disqualified because of pilonidal sinus or cyst revealed that 20 could reasonably be expected to meet retention standards and be utilized in the military service.

Congenital Anomalies

Twenty-five persons in the sample were disqualified at the preinduction medical examination because of congenital anomalies. There were 11 congenital anomalies of the cardiovascular system with atrial and ventricular septal defects predominating; 6 anomalies of the feet and leg; 3 anomalies of the genitourinary system; 4 anomalies of the spine, thorax or vertebrae; and 1 harelip, not corrected by surgery. According to entry standards (AR 40-503), most of these congenital anomalies preclude acceptance. Exception to this statement pertains to spina bifida occulta and other congenital anomalies of the spine which only are demonstrable by roentgenograms and/or when associated with signs and symptoms which have not prevented the person from successfully following a physically active vocation in civilian life.

Retention standards (AR 40-504) do not specifically mention retention criteria for congenital anomalies except for congenital anomalies of the spine inasmuch as those with such conditions are not usually knowingly accepted for service. Persons with spondylolisthesis and spondylolysis are only medically separated when, after appropriate treatment and/or assignment limitations, the individual is determined incapable of performing military service because of recurring or persistent symptoms with moderate activity.

An analysis of the disqualified persons in the group indicated that only 7 of the 25 could be expected to perform military service. All would require assignment limitations.

Nervous System Diseases

Nineteen persons in the sample were disqualified at preinduction examination because of diseases of the nervous system. If retention standards (AR 40-504) had been utilized instead of entry standards (AR 40-503) in determining medical acceptability of the group, 5 of the 19 would have been found physically qualified for service with the Army. A more detailed discussion of the standards and complications involved is given below.

Epilepsy. Ten persons of the sample were disqualified at preinduction examination for paroxysmal convulsive disorder (epilepsy). Entry physical standards (AR 40-503) specify that persons with paroxysmal convulsive disorders and disturbances of consciousness (grand mal, petit mal, psychomotor attacks, and narcolepsy), if adequately controlled by medication of a standard type, are acceptable for induction. Those whose epilepsy can be controlled by drugs which are so toxic as to require frequent clinical and laboratory follow-up are not considered to be adequately controlled. Retention standards (AR 40-504)

further define "adequately controlled" as "freedom from seizures of any type on a therapeutic regimen in which the cooperation of the member has been fully extended." Neither control nor lack of control is assumed until there has been a suitable period of time for observation. Where it is apparent that the member has not cooperated fully in the treatment program and it is the opinion of the medical officer that control has not been achieved by virtue of lack of cooperation, disposition of the individual usually is made for reasons other than medical, *i. e.*, administrative disposition by reason of defective personality, defective attitude, or shirking, as the case may be.

The time available for holding inductees for physical examination at Armed Forces examining stations is limited and no provision for follow-up of individuals examined at these stations is available except at the pleasure of the Selective Service System. As a result, the problem of determining which persons are adequately controlled by medications is extremely difficult for the medical examiner at the Armed Forces examining station. Persons with epilepsy, as a group, are generally well-motivated for military service and frequently seek voluntary induction or enlistment. This is because of the difficulty they have in obtaining jobs in civilian life. It is not infrequent that persons with a history of epilepsy who wish to enter the service will discount symptoms and attacks, further complicating the decision concerning adequate control. During 1954, 83 per cent of those who had been admitted to hospital or quarters for epilepsy were returned to duty.[25] Three of the 10 epileptics were considered to be adequately controlled and to meet retention standards. These three had full-time employment and had completed 12 or more years of schooling.

Other neurological diseases. Nine persons in the sample were disqualified because of miscellaneous conditions of the nervous system. Entry physical standards (AR 40-503) specify that any serious neurological disorder is disqualifying: encephalomyelitis, cerebellar and Friedreich's ataxia, athetosis, Huntington's chorea, cerebral arteriosclerosis, paralysis agitans, chronic or recurrent neuritis, or neuralgia of intensity which is periodically incapacitating, or residuals of concussion or severe cerebral trauma which are incapacitating. Entry standards specify that a man must present a healthy nervous system as manifested by absence of the signs of disease of the brain, spinal cord, and cranial and peripheral nerves. Exceptions to these entry criteria are minor tremors or paralysis not likely to interfere with training duties, or those which have not interfered with locomotion and have not prevented him from successfully following a useful civilian vocation.

Retention standards (AR 40-504) permit those with mild and moderate neurological conditions to be retained, provided they can be successfully utilized. Thus, many persons with mild neuritis and neuralgias, partial paralysis, and mild residuals

of trauma which are nonprogressive and do not interfere with duties, may be considered for retention. Those with multiple sclerosis and other degenerative diseases of that type are usually not retained. Only two persons in this group had conditions of such a nature as to meet existing retention standards. Both were disqualified because of a postcraniotomy defect of the skull in which the bony defect was small and was not expected to interfere with the wearing of a helmet. They were asymptomatic and were gainfully employed. Because of the chronicity and permanency of the majority of medical conditions seen within this group, it is not anticipated that any great manpower gain may be anticipated by utilizing retention standards.

Endocrine and Metabolic Diseases

Twelve persons in the sample were found disqualified at the preinduction examination, 11 for diabetes mellitus and 1 for thyrotoxicosis. Both of these conditions are disqualifying under entry standards (AR 40-503). Exceptions to these criteria have been made in the past for draft-eligible physicians and dentists whose assignment and dietary control could adequately be regulated. Retention standards (AR 40-504) specify that a confirmed diagnosis of diabetes mellitus usually is considered disqualifying for retention in the service except for older individuals with relatively long service whose disease is mild, readily controlled by diet, who cooperate well with control measures and who, by training, are of unusual value to the service and may be considered for retention on an individual basis. None of the 11 diabetics was considered to meet existing retention criteria.

Thyrotoxicosis is usually a remediable condition, and after appropriate therapy most persons with this disease will meet the criteria for retention in the military service. It was not considered desirable to consider those who had evidence of thyrotoxicosis as meeting retention criteria because, should he refuse surgical procedure or other therapy, his utilization would be contraindicated.

Persons with these conditions as a group cannot be depended upon to be productive of additional manpower except for those who have special qualifications required by the military service, *e. g.*, physicians and dentists.

Malignant Neoplasms

Three persons in the sample were disqualified at preinduction examination because of malignant neoplasms or suspected malignant neoplasms. One was disqualified for a seminoma of the testicle for which he had been operated upon recently, one for a suspected renal tumor of unknown cause, and one for a chest tumor of unknown cause. Because of the poor prognosis most of those with malignant neoplasms are not retained in the military service. Entry standards (AR 40-503) always preclude acceptance, even on suspicion, except where there is a docu-

mented five-year follow-up period. None of the three persons in the sample was considered to meet entry or retention standards.

Dental Conditions

Only three persons in the sample were disqualified for dental conditions. Entry standards (AR 40-503) which pertain to dental conditions are extremely liberal, the only requirement being that the edentulous portions of the jaws will be capable of supporting serviceable full dentures. It is rare that a person is ever medically separated from the service because of dental conditions alone. Two of the three persons disqualified were considered to have temporary dental conditions and to meet retention standards.

Infective and Parasitic Diseases

Three persons in the sample were disqualified for entry in the military service because of infective and parasitic diseases, two for symptomatic laboratory-demonstrated schistosomiasis and the third because of a recent history of infectious mononucleosis. The person who recently had had infectious mononucleosis was considered to meet retention criteria, but the two with schistosomiasis were considered disqualified under retention criteria.

Blood and Blood-forming Organic Diseases

One person in the sample had documented hemolytic anemia and was under continuous medical therapy by his local physician and was considered to meet neither entry nor retention criteria for military service.

Miscellaneous Conditions

Eleven persons of the sample were disqualified at the preinduction medical examination because of miscellaneous conditions. In this group were 2 who had thrombotic hemorrhoids; 1 with an infected cyst of the abdominal wall with cellulitis; 4 who recently had been operated on for hemorrhoids, hernia, or appendix; 2 with acute sinusitis; and 1 with acute tonsillitis. One person had a fistula in ano which was considered remediable. Ten of the 11 could reasonably be expected to be available for military service within four to six weeks. The person with fistula in ano could be utilized only if he would agree to a remedial surgical procedure.

CONCLUSIONS

This study indicates that a significant percentage (54.9 per cent) of persons now found to be medically unacceptable for military service at the preinduction examination would meet the retention criteria as utilized by the Army, and could be expected to perform some military service if full utilization of available manpower was necessary. The disadvantages inherent, and

there are many, in lowering entry standards to retention criteria are discussed by disease entity. If, in time of full mobilization, the imperative need for full utilization of manpower becomes a factor of overriding importance to the disadvantages enumerated, it is presumed the decision for lowering entry standards would be made by authority other than the medical services of the Armed Forces inasmuch as nonmedical considerations are the chief factors which prohibit acceptance and utilization. Once this decision has been made, it is further presumed that the medical services of the Armed Forces would recommend acceptance of those inductees with medical conditions below existing entry standards who could be most advantageously employed to meet the determined manpower need; that personnel meeting these revised standards would be selectively phased into the military service, based on immediate and projected availability of military jobs in which they could be utilized.

Anticipating that a time may arise when it will be necessary that medical standards be lowered below the existing level, research is being continued on ways and means of effectively utilizing personnel who are now medically rejected in large numbers at the preinduction examination. Subsequent reports will present data specific to this problem and will provide an experimental basis for the necessary policy determinations. It is not the intent of this study to advocate any lowering of existing entry standards at this time inasmuch as the present entry standards are considered to be realistic.

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MEDICAL MEETING—CELESTIAL STYLE

As a reward for their occasional sufferings, there must be a Heaven for well-behaved audiences. There the speakers will have thought about their audience—what their level of knowledge is, what their interests are, what their threshold for fatigue is—and prepared their addresses accordingly. If they are asked to speak for fifteen minutes, they will have prepared a discourse running at ordinary conversation speed for fourteen minutes; they will address this in clear and bright tones to their audience and not gabble it to the lectern or whisper it just out of microphone range. Their talk will have two or three points of importance, and everything else will be subordinated to getting these few points fixed in the heads of the audience. Their slides will contain the bare minimum of detail needed to make their points, and will be left on the screen long enough for the slowest and most presbyopic readers in the audience to study them. And the only extraneous sound will be the sighs of contentment from former organizers of medical meetings.

—EDITORIAL
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Clinicopathologic Conference

U. S. Naval Hospital, San Diego, Calif.*

FEVER AND HEART FAILURE

Summary of Clinical History. This 20-year-old Caucasian was admitted to this hospital on 8 March 1955. He had been well prior to 2 March, when he developed an erythematous eruption on his face and a continuous frontal headache and sore throat. Two days later he noted malaise and general aches and pains, particularly in his legs. He complained of occasional chilliness and sweats, and for two weeks prior to admission he had a cough, productive of white sputum. Upper chest discomfort was a prominent symptom for several days prior to admission. Past medical history revealed a "similar episode" at about age eight years. The systems review revealed that the patient had had minor symptoms referable to the biliary tract.

Physical Examination. The patient was a well developed, fairly well nourished, but moderately dehydrated young man who appeared lethargic and toxic. His temperature was 104°F, his pulse was 118, and his respirations were of a rapid, Kussmaul type. There was white desquamation of the skin of the face and trunk. Anterior cervical lymph nodes were slightly enlarged. The tongue, roof of the mouth, buccal mucosa, and pharynx were covered with a gray-white material which seemed to be extremely viscid salivary secretions. Auscultation of the chest revealed fine, moist rales in both lung fields, particularly at the bases. No heart murmurs were heard. The abdomen was diffusely tender and there was muscle guarding. Bowel sounds were hyperactive. The remainder of the physical examination was essentially normal.

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Laboratory Studies. The hematocrit was 42 ml per 100 ml, and the sedimentation rate was 38 mm per hour (corrected). White blood cell count was 27,600 per μl, with 92 per cent neutrophils, 5 per cent lymphocytes, and 3 per cent band forms. A repeat blood cell count the next day revealed a leukocytosis of 12,500 per μl, while other values were unchanged. Admission urinalysis was negative, but following catheterization on the fourth hospital day, 3 plus albumin and many red blood cells were noted.

Roentgenograms of the chest showed an inflammatory density along the right cardiophrenic angle compatible with early bronchopneumonia.

An electrocardiogram showed a moderately low ventricular voltage, with low amplitude T waves in aVL and aVF; the interpretation was "suggestive of left ventricular strain."

Febrile agglutinins (including Widal), blood, stool, and urine cultures were all negative. Neither sputum nor throat culture was obtained.

Course in Hospital. The patient was placed on bed rest and isolation, and started on procaine penicillin, 1,200 mg (1,200,000 units) per day, streptomycin sulfate, 1.0 grams per day, and gantrisin, 4.0 grams per day. Fluids were given intravenously. During the first 24 hours, the patient had approximately ten loose stools. Despite therapeutic measures, he remained toxic. A surgical consultant believed that the abdominal problem was related to fluid and electrolyte imbalance. After electrolyte replacement, the following serum values were obtained: sodium, 139 mEq per l; potassium, 5.1 mEq per l; and chlorides, 103 mEq per l; carbon dioxide combining power, 43 volumes per 100 ml. Despite further rehydration, restoration of electrolyte balance, and antibiotic therapy, the patient remained unimproved, and his tachypnea and tachycardia persisted.

On the third hospital day, cyanosis, responding promptly to nasal oxygen, was noted; chest examination was, however, unchanged. At this time oliguria was found, and there was no response to catheterization. Chloramphenicol was begun because of the failure to respond to previously given antibiotics.

On the fourth hospital day, increasing moist rales were heard in the lungs, Cheyne-Stokes respiration began, and the patient became comatose. He was rapidly digitalized, and tourniquets were applied to his extremities.

On the fifth hospital day the patient was started on ACTH and cortisone, but he died soon after.

DISCUSSION

Doctor Gorsuch:* I should like to go through the protocol and attempt to interpret some of the salient points in order to make some generalizations on which to base a reasonable differential diagnosis. The patient is a young man who seemed perfectly well prior to 2 March 1955. I feel reasonably sure that he had no chronic debilitating disease such as diabetes which might account for this acute episode. He is said to have developed an erythematous skin eruption over his face; I would wonder whether this was a broad erythema, perhaps suggestive of scarlet fever, or whether it was the malar erythematous eruption of lupus erythematosus. His symptomatology included frontal headaches, sore throat, aches and pains, chills and fever, and cough. He had upper chest pain; I would have hoped the chest pain description might have been more specific. Lateral chest pain, aggravated by respiration, with pneumonia at least, is characteristic of bacterial pneumonia with pleural involvement. Retrosternal chest pain seems more typical of a viral etiology. Physical examination showed the patient to be lethargic, toxic, and febrile, with a marked tachycardia and respiration of a Kussmaul type. Kussmaul's respiration is commonly seen in severe dehydration and acidosis. Examination of the skin revealed a white desquamation of the face and trunk; we shall later return to this. His lymph nodes were enlarged, and the mouth showed injection, viscous secretions, and a gray-white exudate. All this suggests some sort of mouth and throat infection. Chest examination showed fine, moist rales in both lung fields, while abdominal examination revealed tenderness. The absence of cardiac murmurs or peripheral edema tends to rule out a primary cardiac etiology for this man's illness.

In general terms, this represents a young man, who over a two-week period developed a facial erythema and signs of some type of infectious prodrome with excellent evidence for an upper respiratory infection. Later he seemed to develop a severe bacterial pneumonia, severe because he was dehydrated, lethargic, and toxic. It resembled a bacterial infection because the patient had high fever, tachycardia, and tachypnea, and the patient's very toxicity suggests a bacterial invasion. This probably was a pneumonia because the patient's main trouble seems to have been a productive cough, chest pain, and tachypnea, and he was noted to have bilateral rales on physical examination. At this time, no other organ system is implicated. It seems reasonable to assume that we have, at least what seems to be, a severe bacterial pneumonia.

Going back, we see that the patient's white blood cell count was elevated to 27,000 with a shift to the left, and that his urinalysis was negative. I should like to make a point of the negative admission urinalysis, because I think that the later finding of albumin and red blood cells was probably secondary to the initial process and not a

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part of the primary disease. A roentgenogram of the chest and an electrocardiogram were taken on admission, and we shall have the reports now.

Doctor Yurick:* There is a well-defined peribronchial pneumonia in the right cardiophrenic angle. Findings are consistent with a bronchopneumonia at the right base. There is a granularity of the lung fields bilaterally, although no other infiltrate is seen. The findings are definitely abnormal, but nonspecific.

Doctor Reitz:** Electrocardiograms were obtained on this patient on three successive days (9, 10, and 11 April 1955). The tracings are basically similar, and are characterized by a marked sinus tachycardia, low amplitude, and poorly delineated T waves over the lateral precordial leads. These changes are slightly more marked on the tracing of 10 April 1955, which is definitely abnormal. The changes are considered nonspecific, but could be compatible with underlying myocarditis.

Doctor Gorsuch: I feel sure that most of the electrocardiographic changes are entirely nonspecific and represent a toxic state.

The patient was treated with large doses of penicillin, streptomycin sulfate, and gantrisin, and within the first 24 hours he had 10 loose stools. Was there any relationship between the diarrhea and the antibiotics? With the diarrhea he developed dehydration and abdominal pain. The surgeons believed that his abdominal pain was caused primarily by dehydration, yet despite rehydration and electrolyte replacement the patient deteriorated.

Several other points deserve comment at this time. First, the x-ray findings are minimal, and are less than one would expect with such a toxic state. Possible explanations are twofold: One is that pneumonia is not the primary cause of the toxic state, but rather that it is a reflection of some other process such as dehydration, acidosis, or nephritis. A second possibility is that there is considerably more involvement in the lungs than the x-ray indicated. Physical examination revealed fine moist rales throughout both lung fields, which would suggest an active, advancing pneumonitis of some type.

The second important point is that this patient was treated with antibiotics without response to heavy antimicrobial therapy. This suggests many interesting possibilities, such as metabolic derangements; collagen disease; fungus, virus, or rickettsial disease; or possibly a neoplasm. Is this a bacterial disease which is entirely refractory to ordinary therapy, such as staphylococcal or Friedländer's infection? The absence of sputum or throat cultures is unfortunate, for even if negative they would be of value. If we were dealing with a pneumococcal pneumonia, or a group A beta hemolytic streptococcus

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**Capt. Harvey E. Reitz, MC, USN, Chief, Cardiology Service.

or *Staphylococcus aureus* or Frieländer's pneumonia, we would get a profuse growth on sputum culture. A fungus culture might have been equally helpful.

Terminally the patient developed more rales and severe cyanosis; with nasal oxygen, the cyanosis disappeared. I don't believe that this was a sign of improvement, for cyanosis frequently will disappear in severe pneumonia after consolidation is complete. We also see that the patient became oliguric and that his blood urea nitrogen rose, while red blood cells and albumin were found in his urine. Despite all measures he lapsed into coma and developed Cheyne-Stokes respiration. Terminally, he developed what appears to be pulmonary edema and cardiac failure, also quite common in severe pneumonias. It is fair to assume that the patient died with solid lungs, and the indications are that he had some type of terminal kidney involvement, probably an acute interstitial nephritis or a focal or embolic affair. From the protocol, we can conclude that we are dealing with a suddenly developing process in an essentially well young man, which has all the features of an overwhelming pneumonia with terminal nephritis, and that this process is not stopped or stayed by antibiotics, and that the patient goes irrevocably downhill to his death. With such a case, almost everything must be considered, and I shall try to consider as many possibilities as are reasonable in a brief period of time.

Neoplasm is unlikely because of the fulminating course, although an acute leukemia might give a similar picture. But the blood counts are not suggestive. Similarly, pulmonary fungus and pulmonary tuberculosis may be discarded because of a too fulminating course, absence of sufficient roentgenographic changes, and the presence of marked leukocytosis. Virus pneumonia is equally unlikely to produce such a fulminating course with leukocytosis. The rickettsial diseases could give a clinical picture similar to this one. In their severest forms the onset of these diseases is characterized by malaise, headache, aches and pains, fever, and cough. Usually these diseases show a slow pulse and a high fever, but in severe cases the pulse may be as rapid as the temperature is high. Without a body or extremity rash, rickettsial disease becomes very unlikely. Further, these diseases respond well to the mycin group of antibiotics, while the therapeutic effects of the mycins with this patient were quite negligible. We can consider these diseases, or at least not rule them out entirely.

Now, consider the interesting possibility that there is no infection whatsoever, and that this picture represents a metabolic or inflammatory process secondary to a collagen disease. Are the facial rash and hematuria part of systemic lupus erythematosus. Lupus, with very marked pleural pulmonary mainfestations, will give massive pulmonary consolidation with dyspnea, cyanosis, nephritis, abdominal pain, and diarrhea. However, there is no history of fever, arthralgias, or any evidence of panserositis (endocarditis or arthritis). The white blood cell count is very high for lupus, although white counts as high

as 50,000 have been reported in the pneumonia of systemic lupus erythematosus. We have no evidence of an anemia or marked central nervous system involvement. No LE preparation or serum protein is reported, either of which might have been helpful. All in all, the diagnosis of systemic lupus erythematosus seems to me unlikely.

In discussing the pneumonias which do not respond to antibiotic therapy, we should consider the so-called rheumatic pneumonia. One wonders whether the rheumatic fever with rheumatic pneumonia would be so severe. I personally have not seen it, but it is described, and rheumatic pneumonia in its severest form presents a picture of a severely ill patient with a high fever, marked dyspnea, and cyanosis, and all this is complicated by severe cardiac changes and, sometimes, cardiac failure. A butterfly distribution of the pneumonia, however, is the most characteristic form in these cases. There are other types and distributions of rheumatic pneumonia, but again these are usually symmetrical. This patient lacked the ancillary signs of arthritis, carditis, and cardiac murmurs to support the diagnosis of acute rheumatic fever. Other than the lack of response to antibiotics, there seems to be really little else to suggest rheumatic fever to me.

Let me now consider the most likely group, the bacterial pneumonias. Practically all bacterial pneumonias have features in common with this case. Patients are usually severely ill with chills, pleuritic chest pain, productive cough, fever, tachycardia, tachypnea, cyanosis and myalgia. Examination of the chest shows dullness, crackling rales, and tubular breath sounds. There may be abdominal distention, ileus, rigidity or tenderness in the upper quadrant with pain referred from the parietal pleura of the outer portion of the diaphragm. There may be liver tenderness as a result of congestive heart failure. Complications of pneumonia are nephritis, empyema, meningitis, endocarditis, ileus, shock, and heart failure. It often has been stated that if there is no response in severe pneumonia to adequate antibiotics within 48 hours, then the organism is resistant or one of these complications is present. If we are dealing here with a common bacterial pneumonia, this would be the case.

There are many other bacterial diseases associated with severe toxemia, and we might examine a few at this time. This patient had a tonsillar exudate, an erythematous facial rash, and desquamation, all of which suggest scarlatina. Before antibiotics, severe streptococcal pneumonia, nephritis, and pancarditis were common dreaded complications of scarlatina. However, there are missing features such as strawberry tongue, mouth ulcers, and generalized red rash—but these features are not absolutely necessary. The diagnosis of scarlatina followed by streptococcal pneumonia is appealing, but there is one feature difficult to explain. No penicillin-resistant group A streptococcus has yet been isolated or well identified, and death resulting from a group A streptococcal infection in a properly treated patient is unusual. The tonsillar exudate might also suggest diphtheria. Overwhelming diphtheria with a terminal bronchopneumonia was

formerly a well-known disease entity. Patients were said to be extremely toxic and prostrate, and I believe the gray-white exudate described here could have been a diphtheritic membrane. All the features of diphtheria are similar to this case, and the pneumonia which arises can be severe. Nephritis is characteristic; it usually comes early in contrast to the nephritis of scarlatina which comes late. Myocarditis is present and sudden death is frequent. However, we do not have throat cultures and cannot establish the diagnosis. The lack of peripheral neurologic lesions further mitigates against the likelihood of diphtheria in this case.

Pneumonia, diarrhea, and nephritis apparently suggested the possibility of typhoid fever. The negative agglutination studies, stool cultures, and Widal tests rule out this disease satisfactorily. I shall also mention pleural pulmonary tularemia, which could give a picture consistent with that in the protocol. Fifty per cent of tularemia pneumonia cases do not have a bubo or primary ulcer. The diagnosis must be made on history and a rising agglutination titer, and we have neither. Tularemia should respond beautifully to streptomycin sulfate, but there was no response here.

In conclusion, I believe this to represent an infectious bacterial pneumonia, but I cannot differentiate between the infectious pneumonias on either clinical grounds or from the protocol material. Relying on percentages and my own experience, I would favor one of the coccal pneumonias, and inasmuch as large doses of penicillin were without effect.

Dr. Gorsuch's diagnoses:

1. Staphylococcal pneumonia
2. Terminal interstitial nephritis

PATHOLOGIC FINDINGS

Doctor Cowell:* Thank you, Doctor Gorsuch, for your excellent discussion of this case.

At autopsy, the body was that of a well-developed and well-nourished adult young male of Mexican descent. There was a slight edema of the left arm and hand, and no other pertinent external findings. The findings of interest were confined primarily to the thorax. Each pleural cavity was found to contain about 400 ml of serosanguineous fluid. The serosal surfaces of both parietal and visceral layers were smooth, and the fluid contained no fibrin. There were no adhesions. The pericardial cavity contained about 50 ml of clear yellow fluid. Both parietal and visceral pericardial surfaces were smooth and shiny.

The right lung weighed 1,450 grams, and the left lung 1,550 grams. They were extremely heavy, wet, and solid and there was a nodular feeling over the pleural surfaces and on the cut surface. The surface

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of all lobes was similar. It was very dark mottled red, as if there were massive intra-alveolar hemorrhage beneath the surface, and focally there were small subpleural hemorrhages, particularly posteriorly, and on the diaphragmatic surfaces. Crepitation was almost completely absent. The cut surface of all lobes showed a total consolidation which appeared lobular in nature. This was associated with what appeared to be considerable intrapulmonary hemorrhage, and there was a considerable excess of red bloody fluid from all cut surfaces. A frothy edema fluid was readily expressed from the cut surface of the lung. The tracheobronchial tree contained hemorrhagic, purulent material, in addition to the frothy fluid. Pulmonary vessels were not remarkable. There was a large, soft, red-brown lymph node at the hilus of each lung, but no gross evidence of tumor. Smears and cultures taken from the bronchus and from the lung surfaces were negative. There was no abscess formation, and certainly nothing to indicate a staphylococcic involvement.

The heart weighed 400 grams. The epicardium was smooth and shiny. The surface was brown and fairly firm. The chambers showed a dilatation confined primarily to the left and right ventricle, more pronounced on the right with flattening of the trabeculae carneae and the papillary vessels. The endocardium was smooth and glistening throughout. In the right ventricle was an adherent post-mortem clot. The valves were normal in appearance and had normal measurements. The coronary arteries showed no evidence of arteriosclerotic change. No thrombi were found in auricles or pulmonary vessels. Sections of the interventricular septum and the left ventricular myocardium showed some congestion but no evidence of infarction.

The kidneys and liver were grossly normal. An agonal esophageal perforation was present.

Microscopic sections of the heart belied the innocuous gross appearance. The myocardial fibers were normal. In many areas, there was a transverse fragmenting of the myocardial fibers. The predominant change present was in the interstitial tissue, and usually in the perivascular regions around small intramural vessels of small artery and arteriole size. Here was a definite and, in many areas, widespread fibrinoid degeneration of the collagen, particularly prominent in a perivascular distribution. A mononuclear infiltrate usually surrounded these areas of fibrinoid degeneration and with a haphazard distribution. Occasionally associated with the vessels were structures which we believed represented early Aschoff bodies. These changes in the heart muscle are believed to be characteristic of the early phases of acute rheumatic myocarditis.

Sections of lung showed that in many areas fine architectural detail was completely obliterated by a mass of intrapulmonary hemorrhage with masses of red blood cells filling the alveolar spaces, and obliterating histologic detail. Elsewhere, intrapulmonary hemorrhage was not nearly so marked and prominent changes were evident. These included a thickening of the alveolar walls and interstitial tissue,

and in these alveolar walls or in the interstices of the lung in a widespread fashion was a diffuse and prominent infiltrate of fairly large mononuclear cells with an occasional neutrophil. There was pronounced and extreme congestion. The alveolar walls were thickened and the alveolar lining cells were increased in size and frequently cuboidal and macrophage-like in appearance. In almost all of the alveoli there was a fibrinoid material that was closely opposed to the alveolar wall and took on a hyaline membrane-like appearance, such as is seen in a hyaline membrane disease of the newborn, or in viral or atypical pneumonia. There was no frank bronchopneumonia. These changes were diffuse and present in all the sections of the lung. Edema fluid also was seen focally in the alveoli.

Sections of the kidney showed normal glomeruli, but a moderate cloudy swelling of the tubular epithelium. Mononuclear cells composed a focal cellular infiltrate in the cortical regions. They appeared to be arranged about small arterioles with questionable fibrinoid changes.

Pathological Diagnoses:

1. Acute rheumatic fever with acute massive rheumatic pneumonia, bilateral, involving all lobes
2. Rheumatic myocarditis, acute, and rheumatic arteriolitis, liver and spleen and kidneys
3. Intrapulmonary hemorrhage, extensive
4. Bilateral hydrothorax (400 ml)
5. Congestion and edema of the lungs
6. Multiple subpleural hemorrhages

DOES FERROUS SULFATE AFFECT THE GUAIAC TEST FOR OCCULT BLOOD?

"The blue color of the positive reaction results from the oxidation of a phenolic compound in gum guaiac. This oxidation is possible by hydrogen peroxide if catalyzed by a peroxidase. Hemoglobin has such peroxidase activity and produces the oxidation by hydrogen peroxide giving a deep blue color. Iron does not have such a catalytic power and thus cannot give a positive reaction."

—EDITORIAL
in *Southern Medical Journal*
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CASE REPORTS

Hereditary Spherocytosis in a 41-Year-Old Man

JACK BROOK, *Lieutenant, MC, USNR*
JOHN B. MacGREGOR, *Captain, MC, USN*
THIRL E. JARRETT, *Captain, MC, USN*

HEREDITARY SPHEROCYTOSIS or congenital hemolytic anemia is most frequently diagnosed in children or young adults. Debre and his co-workers[1] reported 20 cases in which the diagnosis was made before the age of 14 years. Occasionally, however, the disease has been diagnosed shortly after birth[2] when a special attempt is made to establish the diagnosis because of the presence of the disorder in one of the parents or a sibling. The diagnosis is seldom made in adults admitted for unrelated complaints, unless it has been noted that other members of the family have been affected.

Young, Izzo, and Platzer[3] in their report of 28 cases noted that symptoms were first detectable at the age of 5 years or younger in 14 of their cases; in 8 the onset of symptoms occurred between the ages of 10 and 45 years; and the remaining 6 had no symptoms referable to the disorder. Nine of the 28 cases were the original members of families investigated, and a prolonged duration of symptoms (16 to 28 years) was present in only four of these patients. Only one in their series was over 40 years of age when the diagnosis was established.

The following case is presented because of the long duration of recurrent symptoms and the age of the patient (41 years) when the diagnosis was finally established.

CASE REPORT

A 41-year-old man was admitted to the U. S. Naval Hospital, Annapolis, Md., on 25 November 1957, because of malaise, anorexia, abdominal pain, numbness of the entire right arm and left thumb, and dark urine of several days' duration. History obtained at that time revealed that he had had scleral icterus intermittently since 1942, and infectious mononucleosis with jaundice in 1942. The physical examination was essentially negative except for mild scleral icterus and an equivocally enlarged spleen.

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Laboratory examinations revealed a hemoglobin of 9.3 grams per 100 ml; hematocrit 28 ml per 100 ml; red blood cell count, 2,900,000 per μl; white blood cell count, 6,500 with a normal differential count. Peripheral smear showed moderate anisocytosis, marked hypochromia, and a few polychromatophilic red cells. The mean corpuscular volume, was 97; mean corpuscular hemoglobin, 32; mean corpuscular hemoglobin concentration, 30; and reticulocyte count, 2.3 per cent. Erythrocyte osmotic fragility test was normal. The Coombs test was negative. Urinalysis and serologic tests for syphilis were negative. Serum bilirubin was 3.04 mg per 100 ml; (direct 0.50 mg; indirect 2.54 mg); cephalin-cholesterol flocculation was 3 plus in 24 hours and 48 hours; and thymol turbidity was 3.4 units.

In view of the intermittent icterus and persistence of slight scleral icterus, the patient was transferred to this hospital on 17 December 1957 to rule out a familial type of hemolytic anemia.

The patient was of Prussian descent. His mother and two siblings were living and well, but no information was available about his father, who had deserted the family when the patient was 6 years of age. The maternal grandparents had died in their eighties. His father's brothers were living and well. No family history of anemia, jaundice, hemorrhage or gall bladder disease was obtained. His wife—of Irish descent—and five children were living and well.

The patient stated that as a child he had had frequent nose bleeds, requiring cauterization on one occasion. He denied ever having had leg ulcers, intolerance to fried or fatty food, or galibladder disease. On reviewing his past history at this time, the patient stated that his first episode of scleral icterus, dark urine, malaise, abdominal pain, anorexia, irritability, and a distaste for smoking occurred in March 1942, while aboard a ship at sea. Treatment consisted of bed rest and a low fat diet, and he recovered in three weeks. In June 1942, he had a recurrence of symptoms and was hospitalized at the U. S. Marine Hospital, Cleveland, Ohio, because of icterus and left upper quadrant tenderness. Laboratory examinations at that time revealed an icteric index of 30; a normochromic, normocytic anemia; and a slightly increased red cell fragility; and two weeks after admission, the peripheral count showed an increase in the number of lymphocytes (of which a moderate number were atypical); a reticulocyte count of 14 per cent; and the heterophile agglutination was positive in 1:1024 dilution. His diagnosis at this time was believed to be infectious mononucleosis with splenitis and jaundice.

The patient stated that since 1942 he had noted a recurrence of his symptoms each year, either in the spring or fall. Each attack was rather mild, except for the one requiring hospitalization in 1942 and the present episode. During recurrence of symptoms, he was able to perform his duties provided he had a good deal of bed rest, a low fat diet, and plenty of fluids. These attacks would last about three or four weeks, were unaccompanied by fever, and would subside

spontaneously. The present episode was preceded by an upper respiratory infection, but no history of infection preceding previous attacks was established. Neurologic symptoms, namely, numbness of the right arm and left thumb, were only associated with the present attack.

Physical examination on admission to this hospital 17 December revealed a well-nourished, well-developed white man with a slight icteric tint of his palms and mucous membranes and minimal scleral icterus. The liver was not palpable. Traube's space was dull to percussion, and the splenic tip was thought to be palpable. He stated that his urine was becoming lighter in color. The remainder of the physical examination was within normal limits.

Laboratory studies on admission revealed the following: hemoglobin 13.9 grams per 100 ml; hematocrit, 41 ml per 100 ml; red blood cell count, 4,450,000 per μl; white blood cell count, 11,500 per μl, with a normal differential; reticulocytes, 5 per cent; and platelets 110,000. The peripheral smear revealed hypochromic, normocytic red cells, a moderate number of microspherocytes, and some basophilic and polychromatophilic red cells (fig. 1). The blood urea nitrogen, fasting blood sugar, total serum protein, albumin, globulin, alkaline phosphatase, serology, sedimentation rate, Coombs test, heterophil and cold agglutinations, and urinalysis were negative or normal.

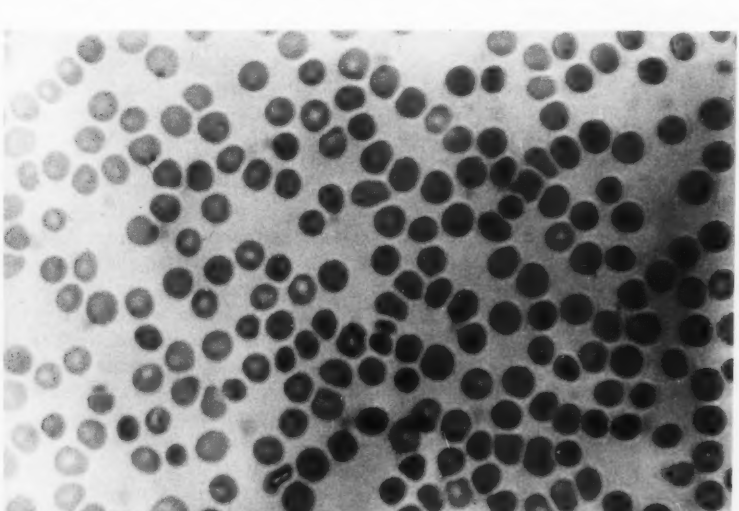

Figure 1. Peripheral smear showing the typical microspherocytes. (× 430)

The serum bilirubin was 3.0 mg per 100 ml (direct, 0.13; indirect, 2.87). Cephalin-cholesterol flocculation, prothrombin time, and thymol turbidity were negative or normal. There was no bile in the urine, and the urinary urobilinogen was 0.55 mg per 100 ml. A 24-hour urine was collected and the coproporphyrin level was 7.43 μg per cent (normal 50 to 300), and the uroporphyrin level was 1.66 μg per cent (normally up to 0.5). After one week the coproporphyrin and uroporphyrin levels became normal. The serum bilirubin gradually decreased in the indirect fraction.

A red cell osmotic fragility test was performed, and hemolysis with the patient's blood began at 0.48 and was complete at 0.36; with the control's blood, it began at 0.44 and was complete at 0.32. An incubated red cell osmotic fragility test was then performed, and hemolysis began at 0.68 and was complete at 0.44 with the patient's blood, while with the control's blood, it began at 0.56 and was complete at 0.40. The latter test was repeated one week later, and with the patient's blood, hemolysis began at 0.85 and was complete at 0.40, and with the control's blood, hemolysis began at 0.68 and was complete at 0.28.

A bone marrow aspiration showed erythroid hyperplasia. Hemoglobin electrophoresis revealed hemoglobin A, and the alkali denaturation was normal. Serum electrophoresis showed a moderate decrease in the alpha 2 fraction, a minimal decrease in the beta fraction, and was otherwise normal.

In the erythrokinetic study, the plasma iron disappearance half-time was 22 minutes (normal is from 60 to 120 minutes); the plasma iron turnover was 3.59 mg per kilogram per day, and the red cell survival half-time was 14 days (normal is from 25 to 35 days). The impression gained by this study was that of an accelerated Fe^{59} removal from the blood stream, but the over-all turnover was normal. In vivo counting revealed an ascending curve for Fe^{59} in the spleen, which may indicate hypersplenism.

Roentgenographic examinations of the chest, skull, and long bones were within normal limits. A gallbladder series showed a normally functioning gallbladder with no calculi.

The above findings confirmed the diagnosis of hereditary spherocytosis, despite the age of the patient, his age at the onset of symptoms, and the doubtful splenic enlargement. This diagnosis was further substantiated after examination of the patient's wife and five children. The oldest son, age 14 years, who had been asymptomatic, revealed typical spherocytes in moderate number on peripheral smear. His hemoglobin was 14.7 grams per 100 ml and the reticulocyte count was 2.4 per cent. No splenomegaly, however, was detected. The next oldest child, age 13 years, also showed typical spherocytes in moderate number on peripheral smear; hemoglobin, 13.2 grams per 100 ml, and reticulocyte count was 3.2 per cent. On examination of his abdomen, Traube's space was dull on percussion and the splenic tip was palpable. The incubated osmotic fragility test showed that hemolysis

began at 0.80 and was complete at 0.32 for both of these children, while hemolysis of the control blood began at 0.68 and was complete at 0.24. The wife and remaining children were found to be normal.

On 13 February 1958, a splenectomy was performed. At operation, the spleen was noted to be greatly enlarged, measuring 19 by 12.5 by 9 cm in its greatest diameter and weighing 852 grams. In addition, an accessory spleen, measuring 2 by 1 by 0.6 cm, was removed from the splenorenal ligament. Smears made from the splenic pulp at the time of surgical intervention showed 50 per cent spherocytes. Microscopic examination of the spleen was compatible with congenital hemolytic anemia. Postoperatively, the platelet count rose gradually to 800,000 per μl by the end of the first week, and then decreased to normal levels; whereas, preoperatively a thrombocytopenia of 90,000 was noted. Two weeks postoperatively, the peripheral smear revealed 20 to 30 per cent spherocytes and Howell-Jolly bodies. An incubated osmotic fragility study was repeated at this time, and the hemolysis began at 0.76 and was complete at 0.44 with the patient's blood; hemolysis with the control's blood began at 0.56 and was complete at 0.36.

The patient made an uneventful recovery from splenectomy and was discharged from the hospital. He and his two children who have the disorder are to be examined periodically.

COMMENTS

The presence of recurrent episodes of jaundice, malaise, anorexia and spherocytes on peripheral smear in a patient over 40 years of age may well indicate a diagnosis of hereditary spherocytosis. The presence of spherocytosis and increased osmotic fragility, especially after incubation, however, may be found in other hemolytic disorders during periods of very rapid hemolysis, but the persistence of abnormalities, even after splenectomy, is an important characteristic of hereditary spherocytosis. In addition, the spleen is almost always enlarged, although in some cases it cannot be palpated.[3,4] Therefore, the absence of splenomegaly should not preclude a diagnosis of hereditary spherocytosis. The unequivocal diagnosis of hereditary spherocytosis should be made only when spherocytes are demonstrated in the patient and in one or more relatives, as in this case.

The studies of Race[5] and Meulengracht[6] indicate that hereditary spherocytosis is probably inherited as a Mendelian dominant. Little was known of the patient's family background of illnesses, but the diagnosis of hereditary spherocytosis was confirmed in two of his five children. It is interesting to note that only two of his five children had this disorder. Family studies of Race,[5] Young, Izzo, and Platzer,[3] and Young[7] also demonstrated a shortage of affected offspring of a propositus (less than the expected 50 per cent incidence).

We wish to re-emphasize that in an older patient with spherocytes in a peripheral smear, a questionably enlarged spleen and a supposedly negative family history, the possibility of hereditary spherocytosis should not be eliminated until the entire family has been investigated.

SUMMARY

A case of hereditary spherocytosis is presented in which the diagnosis was made when the patient was 41 years of age and had had annual recurrence of symptoms for the past 16 years. Enlargement of the spleen was doubtful on physical examination, but at operation it was found to be greatly enlarged. The unequivocal diagnosis of hereditary spherocytosis was made by investigating the family and finding the disorder present in two of the patient's children. Splenectomy caused no change in the spherocytosis or the red cell osmotic fragility, as has been previously reported by other investigators in confirmed cases of hereditary spherocytosis.

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Necrobiosis Lipoidica Diabeticorum

VIRGIL H. VOSS, *Captain, USAF (MC)*

EVERY physician should be familiar with the more common skin manifestations of diabetes mellitus. Genital or rectal pruritus, submammary intertrigo, and pyogenic or monilial infections are among the skin conditions requiring exclusion of this disease. In a recent issue of the *Journal,* a relatively rare skin condition associated with diabetes, xanthoma diabeticorum, was described.[1] An even more unusual and much more recently described skin lesion usually associated with diabetes mellitus is necrobiosis lipoidica diabeticorum. In the case herein described, this uncommon skin condition proved to be the harbinger of the systemic disease.

The entity, necrobiosis lipoidica diabeticorum, was described by Oppenheim[2,3] in 1929 and in 1932. He named the condition "dermatitis atrophicans lipoides diabetica." Urbach[4] described a similar case in 1932, and gave the condition its present name.

CASE REPORT

The patient, a 30-year-old Caucasian, was first seen during military sick call. His chief complaint was persistent patchy areas of "skin eruption" on the lower legs, extending from the ankles to the knee joints. He stated that it was approximately two years since the first lesions appeared, and that he had seen several physicians in the interim who had prescribed various ointments and lotions to no avail. Because the lesions caused the patient no difficulty, other than the cosmetic blemish, he did not become too concerned about them.

In the course of a cursory systemic review the patient mentioned that he had lost about 35 pounds in the previous 12 months despite the fact that his appetite had seemed to increase. The patient also volunteered the information that he seemed to be drinking more fluids in recent months, and that he had concomitant polyuria.

The patient was hospitalized following a urinalysis which revealed a 4-plus glycosuria. After further study he was treated for diabetes mellitus. His past history was negative for other significant illnesses. He had been hospitalized in a U. S. Air Force hospital, for the removal of a "neuroma" from the dorsum of his right hand, about 13 months

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prior to his present hospitalization. A check of the results of the laboratory work performed at that time revealed that the preoperative urinalysis had been reported as "normal."

Family history was negative for diabetes insofar as the patient knew. He was familiar, however, only with the paternal side of his lineage.

Physical examination did not show any evidence of marked recent weight loss, though the patient was somewhat asthenic in appearance. A comparison of his appearance on admission with a photograph taken a year before, however, substantiated his statement of marked weight loss (fig. 1, A and B). On the lower extremities were numerous plaque-like areas, varying in size from 1 cm in diameter to a confluent

Figure 1. Appearance of patient (A) *12 months prior to his hospitalization, and* (B) *on admission to the hospital.*

area involving the lateral malleoli of both ankles (fig. 2, A and B). The smaller lesions were of violaceous hue, while the larger varied in color from a dark red to a yellowish brown. Slight evidence of scaling was seen on the surface of some of the lesions. Their surfaces were cartilaginous to touch and were nontender to pressure. Physical findings including funduscopic examination, were otherwise negative.

A routine roentgenogram of the chest revealed no significant abnormality, a flat plate of the abdomen did not show any evidence of calcification of the pancreas, and roentgenograms of the pelvis were negative for evidence of blood vessel calcification.

Significant laboratory studies revealed a blood glucose (fasting) of 380 mg per 100 ml, a total serum cholesterol of 164 mg per 100 ml (38 per cent as esters), and a normal complete blood cell count. Urinalysis was negative except for a 4-plus sugar.

Figure 2. Photographs of patient's legs, (A) *taken from the right side and* (B) *taken from the left side. Notice the symmetrical distribution of the lesions.*

Details of this patient's hospital course are not pertinent to the purpose of this article. Management of his diabetes was brought about by gradually increasing doses of insulin and a standard 2,200-calorie, diabetic diet. At the time of his discharge from the hospital he was taking 40 units of neutral protamine Hagedorn insulin and 15 units of regular insulin each morning.

DISCUSSION

Unfortunately, the patient was transferred before a pathologic confirmation of the clinical impression of necrobiosis lipoidica diabeticorum was obtained, but a review of the literature revealed that it has not been uncommon to report cases without microscopic confirmation. A survey of the literature from 1929 through 1940 shows that of 54 cases described, only 35 included histologic descriptions. Hildebrand, Montgomery, and Rynearson[5]

stated: "It should be possible to make a diagnosis of necrobiosis lipoidica diabeticorum on the clinical appearance of the lesions alone." Rattner[6] confirms the fact that the lesions of this condition are typical clinically—in fact, even more so clinically than histologically.

Microscopically, the lesions are variously described in the literature, the most consistent features being a normal or slight atrophy of the epidermis, a dilatation of the capillaries of the superficial layers of the cutis, and a degenerative or "altered" appearance of the connective tissue in the cutis.[5] Elastic tissue is lost. Lipoids are observed in the region of the degenerated collagen fibers, and these characteristically stain a reddish brown with sudan III.[7]

An excellent summary of the gross features of the lesions of necrobiosis lipoidica diabeticorum were presented by Ilitch.[8] The typical lesion may go through four phases: (1) a small, reddish, infiltrated papule; (2) an increasingly larger lesion which takes on a violescent hue; (3) a slightly raised, firm, yellow plaque which may soften and sometimes ulcerate; and (4) a flattened, yellowish region with central atrophy and depression, and a peripheral irregular scaling red region of infiltration. In a patient with necrobiosis lipoidica diabeticorum, lesions may be found demonstrating any one or a number of these "phases."

The lesions are usually bilateral, and are most often found on the lower extremities. Almost any other area of the body may be involved, however. About 90 per cent of the cases described are in women. The first cases cited in the literature were invariably associated with diabetes mellitus, but subsequently a number of cases of necrobiosis lipoidica diabeticorum have been reported in which no concomitant diabetes could be detected.[9, 10]

Incidence of the condition is variously estimated. An estimate of one case of necrobiosis lipoidica diabeticorum in 1,000 diabetics is made by one author.[11]

The pathogenesis of necrobiosis lipoidica diabeticorum remains obscure. Trauma, hyperglycemia, hyperlipemia, insulin, circulatory disturbances, diet, and a number of other factors have been implicated without substantiating proof.

No effective treatment has been found. Regulation of diabetes, subcutaneous injection of insulin beneath the lesions, and roentgen or ultraviolet therapy have not proved significantly effective.[12] The lesions are usually asymptomatic, however, and sometimes they resolve spontaneously.

SUMMARY

A case of previously undetected diabetes mellitus in a young white male, whose chief complaint was a peculiar "skin

eruption" involving his lower extremities, is described. On the basis of the characteristic appearance and location of the skin lesions, in association with diabetes, a diagnosis of necrobiosis lipoidica diabeticorum was made. A brief discussion of this condition is presented. An awareness of this rather unusual dermatologic manifestation of diabetes should be fixed in every physician's mind because it may serve as a guide to the detection of the more significant systemic disease.

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OVERCONSCIENTIOUS ANONYMITY

To refer to an article of my own... may suggest I am immodest. That is a risk of using the first person. Yet avoiding "I" by impersonality and circumlocution leads to dullness, and I would rather be thought conceited than dull. Articles are written to interest the reader, not to make him admire the author. Overconscientious anonymity can be overdone, as in the article by two authors which had a footnote, "Since this article was written, unfortunately one of us has died."

—RICHARD ASHER, M. D.
in *British Medical Journal*
p. 503, 23 Aug. 1958

Neurological Symptoms Possibly Related to Poliomyelitis Immunization

EDWARD S. MONGAN, *Captain, MC, USA*

NEUROLOGICAL complications of immunization procedures sometimes occur in vaccination for smallpox,[1] pertussis,[2] typhoid,[3] and rabies.[4] Since 1954 the Salk vaccine for immunization against poliomyelitis has been widely used in this country. The following is a case report of a patient who developed neurological symptoms soon after immunization with Salk vaccine.

CASE REPORT

The patient, a 25-year-old white nurse, was admitted to this hospital on 24 April 1957. Two days prior to admission she noted weakness in her right leg. The next morning she awoke with a moderate frontal headache, generalized malaise, and weakness and pain in the lumbar area, the right gluteal area, and in the right leg. Her temperature was 101°F. She put herself on Terramycin (brand of oxytetracycline), 250 mg four times a day, and inasmuch as she was off duty, spent the day in bed. On the day of admission her symptoms persisted, and in addition, she noted pain and weakness in her right arm. She was admitted to the communicable disease service of this hospital as a possible case of poliomyelitis.

The past history revealed a fracture of the left ulna in 1952, an appendectomy in 1953, and a dilatation and curettage for functional bleeding in 1956. There was no history of allergy in the patient or in her family. The father had died at age 32, as a result of heart disease and pneumonia. Her mother and one sister were alive and well. The patient had received no injections in the previous six months except for her first poliomyelitis immunization with the Salk vaccine, in her right arm, on 13 March, six weeks before admission; and her second poliomyelitis immunization, in her left arm, on 22 April, about three hours before she became ill.

Physical examination revealed an acutely ill young woman. Her oral temperature was 99.9° F; respirations, 22 per minute and normal in depth; pulse rate, 106 per minute and regular; and her blood pressure

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From William Beaumont Army Hospital, El Paso, Tex. Dr. Mongan is now in the Department of Medicine, University Medical Center, Strong Memorial Hospital, 260 Crittenden Blvd., Rochester, N. Y.

was 120/75 mm Hg. Her pharynx was mildly injected but there was no subjective soreness. Funduscopic examination of the eyes was normal. There was marked weakness of the patient's right arm and leg, but no muscle atrophy was noted. All sensory modalities and cranial nerves were normal. The deep and superficial reflexes were active and equal.

Laboratory examination revealed a white blood cell count of 10,200 per μl, with 62 per cent neutrophils, 32 per cent lymphocytes, 2 per cent monocytes, and 4 per cent eosinophils. Urinalysis and serologic tests for syphilis were negative. The hemoglobin was 14 grams per 100 ml and hematocrit was 39 ml per 100 ml. Roentgenographic findings of the chest, pelvis, and lumbosacral spine were normal. A lumbar puncture on admission revealed a clear, colorless fluid with an initial pressure of 110 mm and a closing pressure of 80 mm of water. No blood cells were found. The spinal fluid sugar was 75 mg per 100 ml, the chloride was 100.5 mEq per liter, and the total protein was 66 mg per 100 ml. The spinal fluid Wassermann test and culture were negative. The electroencephalograph was normal. A culture of material from the throat was negative. The heterophil titer was 1/7, and no atypical lymphocytes were found.

The patient was placed on absolute bed rest, a heat cradle was placed over her legs, and codeine was administered as needed for 48 hours for relief of pain. Muscle pain and spasm gradually subsided in 72 hours, but muscle weakness became more marked. For the first 20 hospital days the patient had a temperature above 99.5°F at least some part of every day. No localizing site of infection could be found. After the twentieth day she became afebrile and remained so for the rest of her hospitalization. Her deep tendon reflexes and sensation remained normal at all times. An ophthalmologist found her fundi, extraocular muscles, and visual fields to be normal. A physiotherapist confirmed the muscle weakness of the right upper and lower extremities and started infra-red therapy to the right thigh and active re-education of the affected muscles. Neurological and neurosurgical consultants believed that the patient did not have poliomyelitis, but were unable to make a definitive neurological diagnosis.

By the sixth hospital day the patient began to have rapid recovery of muscle strength. By the eighth hospital day she had regained normal muscle power in her right arm, but the right leg was still weak. She was ambulatory but although she had no pain, her gait was markedly abnormal. A repeat lumbar puncture on that day revealed clear, colorless fluid with normal dynamics and pressure. The spinal fluid sugar was 60 mg per 100 ml, the chloride was 128 mEq per liter, and the total protein was 62 mg per 100 ml. Again, no blood cells were found, and the culture was negative.

The patient continued to improve on physiotherapy. On the twenty-fifth hospital day a repeat lumbar puncture revealed clear, colorless fluid with a pressure of 80 mm of water. No blood cells were found, and the culture was negative. The spinal fluid sugar was 65 mg per 100 ml,

the chloride was 125 mEq per liter, and the total protein was 36 mg per 100 ml. By the forty-fifth hospital day the patient's gait was normal. There still was slight weakness of her right gluteal muscles. She was shown how to do the physiotherapy exercises at home, and a 30-day convalescent leave was granted.

On 5 July the patient returned from leave with only a trace of muscle weakness in her right leg. She was, therefore, returned to duty on 8 July. On re-examination in October she had no discernible muscle weakness at all.

DISCUSSION

The aim of prophylactic immunization is to stimulate the formation of protective antibodies by exposing the host to an antigen. A small percentage of patients immunized against smallpox, pertussis, typhoid fever, and rabies develop neurological complications after immunization. The pathologic picture in fatal cases is described as primarily one of myelin destruction, perivascular lymphocytic infiltration, and microglial proliferation with little damage to the nerve cell.[5] Although the pathophysiology of such complications is unknown, the most accepted theory today is that these neurological sequelae may be related to antigen-antibody reactions that take place in nervous tissue.[6] Inasmuch as these complications have been observed following widespread immunization involving the parenteral use of biologic materials, the possibility exists that neurological symptoms might develop in some patients receiving Salk vaccine.

A precise diagnosis of this patient's illness was not made. Poliomyelitis seems unlikely because there was never any stiffness of the neck or any associated neurological signs; no blood cells were present in the spinal fluid, even in the active stage of the illness when muscle weakness was progressing; and the patient continued to run a low-grade fever without a site of infection for the first 20 hospital days, even while clinically regaining muscle strength. It seems more tenable to postulate that she developed an ill-defined neurological illness following poliomyelitis immunization. The temporal relationships of the first and second injections of Salk vaccine and the appearance of the neurological symptoms in this patient fit the current concept of the allergic nature of such sequelae. Sufficient time elapsed after the first injection to permit formation of antibodies which could then react promptly with the antigen introduced in the second injection to cause symptoms.

The occurrence of neurological symptoms after immunization with the Salk vaccine has been mentioned by Nathanson.[7] Since the U. S. Public Health Service is interested in receiving reports of all suspicious cases, a summary of this case was forwarded to Dr. Nathanson. While it was certainly not proved that this patient's illness was related to the Salk vaccine, the possibility of such a relationship is suggested. Since the neurological

complications of vaccinations are so rare, it is only by reporting all suspicious cases that it will be established whether or not they may follow immunization with the Salk vaccine.

SUMMARY

A patient with a neurological disease following immunization for poliomyelitis with the Salk vaccine is presented. The possibility that this illness might be a neurological complication of the immunization procedure is discussed.

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GOOD MANNERS IN MEDICAL WRITING

Readers are entitled to expect educated writing from medical authors, members of what Osler called, in the language of his day, "the profession of a cultivated gentleman." They are entitled to expect that facts and ideas will be clear in a writer's mind before he commits them to paper, and that he will try to express them in the best and most appropriate words. This is just a matter of good manners, but, as Sir Arthur Quiller-Couch has said, "Style in writing is much the same thing as good manners in other human intercourse." We must consider the reader and put ourselves in his place if we are to communicate with him effectively. We shall then see that it is rather cheap to offer him unreliable data or muddled ideas; that it is presumptuous to expect him to understand our personal jargon words and phrases and our unorthodox abbreviations; that it is offensive to confront him with crudities of expression and the ambiguities inseparable from faulty grammar and sentence construction.

—in *The Medical Journal of Australia*
p. 131, July 26, 1958

GEN. NIESS NAMED CHIEF OF AIR FORCE MEDICAL SERVICE TO SUCCEED GEN. OGLE

Major General Dan C. Ogle, Surgeon General of the Air Force for the past four years who retires on 30 November after almost thirty years' active service, will be succeeded by Major General Oliver K. Niess, since September 1954 Command Surgeon of the Pacific Air Forces with headquarters at Hickam Air Force Base, T. H.

General Ogle

A chief flight surgeon since 1932, General Ogle has dedicated himself to aeromedicine in its broadest aspects. Under his administration the Air Force has realized its goal for an Aeromedical Research Center at Brooks Air Force Base, Texas, and the construction of 170 new medical facilities world wide. He has brought the level of Air Force military medicine to a new high through his active participation in medical, hospital, and scientific organizations.

A native of Keithsburg, Illinois, General Ogle received his medical degree from the University of Illinois College of Medicine in 1929, and entered the U. S. Army Medical Corps as a first lieutenant. In March 1942, as surgeon of the Technical Training Center in Miami Beach, Florida, he organized the medical service within the Miami area and developed a 3,000-bed hospital center including a regional hospital in Coral Gables. In December 1944 he was assigned as surgeon of the Fifteenth Air Force in Italy where he pioneered the development of a medical service to support strategic Air Force operations. The following year he returned to the United States where he became Surgeon of Air University and instructor in medical subjects.

Upon graduating from the Air War College in June 1949, General Ogle was assigned as Special Assistant to the Surgeon General and subsequently as Deputy Surgeon General. One of the few senior Air Force Medical Service officers who had commanded a general hospital,

General Ogle applied his broad administrative and professional experience to the development and operation of the fledgling Air Force Medical Service. Established on 1 July 1949, this Service during the next two and a half years was to provide medical support for a military population that doubled in strength and required combat medical support in Korea. In March 1953, he was named Surgeon of the United States Air Forces in Europe at Wiesbaden, Germany, and the following year was recalled to Washington to assume the position of Air Force Surgeon General.

General Niess, who will become the fourth surgeon general of the Air Force, has been instrumental in establishing medical care for U. S. nationals throughout southeast Asia. He organized and supervised yearly Pacific Air Force medical conferences which have been attended by representatives from the Asiatic countries. For establishing medical relationships between the United States and southeastern Asiatic countries, he has received commendations from various regional ambassadors.

General Niess

In July 1951 General Niess was selected to inaugurate and implement a system of inspection for the Air Force Medical Service and was designated as staff medical officer in the Office of the Inspector General with duty at the 1003d Inspector General Squadron at Kelly Air Force Base, Texas. A year later he was named Chief of the Medical Services Division, Office of the Inspector General, with duty at Norton Air Force Base, California, with the 1002d Inspector General Group. In this position he had the opportunity to study the entire organization of the Air Force Medical Service as a result of which he gained detailed understanding of world-wide medical problems.

Born in Belleville, Illinois, General Niess served his internship at the Fitzsimons General Hospital after graduating from Washington University School of Medicine in 1927. During World War II, he served as Director of administration in the Office of the Air Surgeon, Washington, D. C.; surgeon of the India-China and Pacific divisions of the Air Transport Command in Calcutta and Hawaii, respectively. In 1950 he returned to Washington, D. C., as special assistant to the Director of Plans and Hospitalization, Office of the Air Force Surgeon General. On 30 June 1950, he was appointed Air Force member on the Armed Forces Medical Policy Council, Office of the Secretary of Defense.

General Niess is a graduate of the Army Medical Service School, the U. S. Air Force School of Aviation Medicine, and the Command and General Staff School. He is board certified in aviation medicine and is rated as Chief Flight Surgeon and as Aircraft Observer (Medical). He is a fellow of the American College of Surgeons, and a member of the American Medical Association, the Aero Medical Association, and the Association of Military Surgeons.

Army Chief Nurse Visits Japan

Colonel Inez Haynes (left), Chief of the Army Nurse Corps, greets John McConville, a young patient at the U. S. Army Medical Center in Japan. She is shown with First Lieutenant Ellen Johnson, NC, USA, and Colonel Charles H. Moseley, Surgeon, U. S. Army Japan, on a recent visit to Army medical facilities in the Far East. She was accompanied by Lt. Colonel Dorothy Saulnier, chief nurse of the Medical Center, Japan, and Lt. Colonel Esther Claussen, chief nurse, 8th U. S. Army.

Colonel Haynes visited medical facilities in Alaska, Japan, Korea, Okinawa, and Hawaii during a 40-day trip.

Official Decorations

The following awards were recently announced by the Departments of the Army and the Air Force.

Legion of Merit

Louis B. Arnoldi, Col., USAF (MC)
Earl Maxwell, Brig. Gen., USAF (MC)
Charles S. Mudgett, Col., MC, USA

Air Force Commendation Medal

George R. Steinkamp, Lt. Col., USAF (MC)

GEN. DECOURSEY RECEIVES SECOND STAR, WERGELAND AND CRAWFORD PROMOTED

A brigadier general and two colonels of the Army Medical Service were promoted in mid-October in widely separated ceremonies held in Texas, France, and Washington.

At Fort Sam Houston, Texas, Brigadier General Elbert DeCoursey, commandant of the Army Medical Service School, received the two stars of a major general from Lieutenant General Guy S. Meloy, commanding officer of the Fourth United States Army. General DeCoursey assumed his present position at Brooke Army Medical Center in 1955, after having served as Director of the Armed Forces Institute of Pathology in Washington. He is a graduate of the University of Kentucky and Johns Hopkins University School of Medicine.

Colonel Floyd L. Wergeland, Executive Director, Office for Dependents' Medical Care, was promoted to brigadier general in a

Brigadier General Floyd L. Wergeland, MC, USA, receives his stars from General Cooney and Mrs. Wergeland as First Lieutenant Floyd L. Wergeland, Jr., MC, USA, watches proudly.

ceremony held in the office of Major General James P. Cooney, Deputy Surgeon General of the Army. General Wergeland was chief of the personnel division in the Office of the Army Surgeon General from February 1957 until its reorganization in May of this year when he

was made Assistant to the Executive Director for the Medicare program. He became executive director of the program in September. He received his medical degree from the College of Medical Evangelists in 1932, and is a 1954 graduate of the National War College.

Mrs. John L. Crawford pins on her husband's new stars in Orleans, France, with daughter, Marlene, looking on.

Colonel John L. Crawford, Commanding Officer of the 9th Hospital Center, Landstuhl, Germany, was recently promoted in a ceremony at Headquarters, U. S. Army Communications Zone, Europe, Coligny Caserne, Orleans, France. Prior to his assignment as commanding officer, 9th Hospital Center, he was the Surgeon, United States Continental Army Command, Ft. Monroe, Virginia, from 1953 to 1958. He is a 1932 graduate of the Indiana University School of Medicine.

Coming Meetings

Association of Military Surgeons of the United States. Statler Hotel, Washington, D. C., 17-19 November 1958.

National Conference on Air Pollution. Sponsored by the United States Public Health Service. Sheraton Park Hotel, Washington, D. C., 18-20 November 1958.

A MESSAGE FROM THE A. M. A.

Recently there has been a renewed interest in proposals for the utilization of the experience and talents of military reservists in civil defense. There is little doubt that the present civil defense organization requires reinforcement and strengthening if it is to meet the demands of an enemy attack or other large-scale natural disaster.

At the annual convention of the Reserve Officers Association in June 1958, a resolution was approved in which it was proposed that the Reserve Officers Association and the National Guard Association, in co-operation with the Department of Defense and the Office of Civil and Defense Mobilization, make a joint study of ways and means to employ the skills and experiences of standby, active, and retired reserve officers of the reserve components in formulating a practical plan for civil defense.

Then, on 19 August 1958, Senator Carl T. Curtis of Nebraska recommended on the floor of the Senate that the nation utilize military reservists in civil defense work. Senator Curtis pointed out that the job of civil defense is so great that, if it ever becomes necessary to perform it, additional help will be required. At such time, disciplined units that know what to do and have the ability to do it would be of inestimable value.

Senator Curtis suggested that reservists of all military branches should be unified and assigned the major responsibility for civil defense. Such reservists could earn participation and retirement credits by teaching or attending classes with nonreservist civil defense workers and the general public. Lectures and exercises on the civil defense problems of individual survival methods, water and food supply, public health and sanitation, police methods, first aid and medicine, transportation, communications, engineering, and other matters would prepare the people of the nation to meet a major disaster.

It is natural that the medical profession is concerned with this problem from the viewpoint of the medical and health needs of the civilian population under disaster conditions. Physicians and paramedical personnel must prepare themselves for the management and care of mass casualties that would result from an atomic, biological, or chemical attack. Moreover, it is incumbent upon the medical profession to exert forceful and dynamic leadership in the civil defense program at national, state, and local levels.

In 1956, the American Medical Association, upon recommendation of its Council on National Defense, approved a resolution

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From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor*

that the Surgeon General, U. S. Army, be requested to permit instruction in the use of the 200-bed civil defense emergency hospital, and that such instructional activity be made a part of the training programs of reserve units and incorporated as a part of the Department of the Army medical training program for which annual unit training and armory drill pay is permitted. Subsequently, this resolution was extended to include the U. S. Navy and U. S. Air Force. This activity was incorporated in the military programs as one step toward the assumption by reserve armed forces medical units of a role in civil defense operations. The excellent work of the Army Medical Service in the conduct of courses on the management of mass casualties at the Walter Reed Army Medical Center and the Brooke Army Medical Center is another most worthwhile activity in this direction. Much more remains to be done.

Reserve medical units of the armed forces are organizations in being which are capable of giving the type of service that could reinforce and strengthen the civil defense effort during the initial phases of a disaster situation without dislocating the defensive capabilities of the country. It is a current concept that reserve medical units will not be called and deployed immediately after an enemy attack. Thus, in the interim between the attack and call-up and deployment, the services of skilled medical and paramedical reservists could be used to advantage in civil defense work. Moreover, trained reserve medical units would give direction and stability to the work of civil defense medical operations. Additional civilian workers could be more rapidly trained to assume civil defense duties by working with the armed forces reserve medical units. In this way, in a disaster situation, trained civilians could take over civil defense duties more rapidly so that the reserve medical units could be relieved of their civil defense mission and deployed for military duty.

It is noteworthy that the Canadian army is currently training and planning to use its reserve forces as a supplement to civil defense of their country. Canadian experience indicates that there is complete agreement between the army, the reserve units, the civilian medical profession, and civil defense officials. This has proved to be a valuable working arrangement.

In conclusion, it may be said that a plan should be developed whereby reserve medical units and individuals, who would not be involved immediately in military operations, should be used to supplement civil defense operations, so that needless suffering and death can be avoided in the event of enemy attack or in any other disaster situation. In addition, as soon as possible, civilians without any military obligation should be trained to fill the positions occupied by medical reservists serving with civil defense so that reserve medical units may be redeployed for military duty.

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GEN. McNINCH HEADS ARMY MEDICAL R&D

Lt. Gen. Emerson L. Cummings, Commanding General, U. S. Army Japan (left), Capt. Walworth F. Williams, USA, and Brig. Gen. Joseph H. McNinch, MC, USA, review an honor guard at Camp Zama, Japan, prior to Gen. McNinch's departure recently for Washington, D. C. The former surgeon of the U. S. Army in Japan has been named the first commanding general of the new Army Medical Research and Development Command. The headquarters of the new command was formed from the former research and development division in the Office of the Surgeon General.

New Hospital at MATS Headquarters. This five-story, 250-bed, air-conditioned hospital of reinforced concrete was officially dedicated in ceremonies at Scott Air Force Base, Illinois, on 9 November. Colonel Carl B. Stilson, USAF (MC), is the commander.

Navy Lecture Series Begins

Kenneth B. Babcock, M. D., Director of the Joint Commission on Accreditation of Hospitals, was the first speaker of the fourth annual guest lecture series at the U. S. Naval School of Hospital Administration, Bethesda, Maryland, on 17 October. His subject was "Hospital Standards as Means of Improvement of Patient Care." The other guest lecturers of the series are: John P. Hagen, Ph. D., Director, Project Vanguard, U. S. Naval Research Laboratory, 21 November; Edwin L. Crosby, M. D., Director, American Hospital Association, Chicago, 16 January 1959; George W. Latimer, Associate Judge, United States Court of Military Appeals, Washington, D. C., 20 February 1959; and James A. Hamilton, Professor and Director, Course in Hospital Administration, University of Minnesota, 20 March 1959.

MSTS "Pirates." Capt. F. D. ("Spike") Lovejoy, MC, USN, Director of Medical Services, Military Sea Transportation Service, North Pacific Subarea, kneels before "Captain Kidd" of the Seattle Seafair "pirates" to receive his honorary degree of "pirate." Captain Lovejoy, along with eight other officers of equal rank, received his "degree" during ceremonies held recently for the departure of the U. S. S. *General A. E. Anderson* from Seattle.

Professional Courses for Army Officers

A new series of postgraduate professional short courses for Army Medical Service officers will be held in Washington, D. C., at Walter Reed Army Medical Center and the Armed Forces Institute of Pathology, and at Brooke Army Medical Center, San Antonio, Texas. Interested officers who are eligible to attend should apply through channels to the Surgeon General, Department of the Army, Washington 25, D. C., Attention: MEDCM-OF. The dates and subjects are:

Walter Reed Army Medical Center: oral surgery, 5-9 Jan.; surgical nursing, 12-17 Jan.; radioisotopes in medicine, 12 Jan.-10 Apr.; institute for personnel officers, 9-13 Feb.; refresher course for laboratory officers, 9-14 Feb.; experimental basis of psychiatric theory, 9 Feb.-6 Mar.; management of mass casualties, 16-21 Feb.; institute for comptrollers, 16-20 Feb.; nursing in the medical management of mass casualties, 9-14 Mar.; and medico-military application course for nuclear medical officers, 23 Mar.-24 Apr. 1959.

Brooke Army Medical Center: physical therapy institute, 9-11 Feb.; management of mass casualties, 9-13 Feb.; institute for supply officers, 2-6 Mar.; and surgery in acute trauma, 9-13 Mar. 1959.

Armed Forces Institute of Pathology: ophthalmic pathology, 9-13 Mar., and pathology of the oral regions, 23-27 Mar. 1959.

DEATHS

KIRNER, Stephen Harper, Lieutenant, junior grade, MSC, USNR, of Kensington, Md.; assigned to the Naval Medical Research Unit, 2, Taipei, Taiwan; graduated in 1952 from Hamilton College, Clinton, N. Y., received Ph. D. from Cornell University, Ithaca, N. Y. in 1956; appointed a lieutenant, junior grade, 28 February 1957; ordered to active duty 28 February 1957; died 20 September 1958, age 27, at Hualien, Taiwan, of injuries received in an automobile accident.

MALDONADO-RIVERA, Miguel Angel, Captain, USAFR (MC), of San Juan, P. R.; stationed at the U. S. Air Force Hospital, Francis E. Warren Air Force Base, Wyo.; graduated in 1955 from the University of Puerto Rico School of Medicine; appointed a first lieutenant in the United States Air Force Reserve 6 August 1956; ordered to active duty 31 December 1956; died 26 August 1958, age 28, at Francis E. Warren Air Force Base, of gunshot wound.

SWANSON, Ernest Bruce, Captain, USAF (MC), of Minneapolis, Minn.; assigned to the 327th U. S. Air Force Dispensary, Truax Field, Madison, Wis.; graduated in 1956 from the University of Minnesota Medical School, Minneapolis, Minn.; commissioned a first lieutenant in the United States Air Force Reserve 8 February 1957; ordered to active duty 12 September 1957; died 14 July 1958, age 27, near Mauston, Wis., in a civilian aircraft accident.

Reviews of Recent Books

COLD INJURY, GROUND TYPE, Medical Department, United States Army in World War II, by Colonel *Tom F. Whayne,* MC, USA (Ret.) and *Michael E. DeBakey,* M. D. Prepared under the direction of Major General *S. B. Hays,* MC, USA. Editor in Chief: Colonel *John Boyd Coates, Jr.,* MC, USA; Associate Editor: *Elizabeth M. McFetridge,* M. A. 570 pages; illustrated. U. S. Government Printing Office, Washington, D. C., 1958. Price $6.25.

This comprehensive book covers practically all phases of a difficult and controversial problem. To accumulate the vast information from a multitude of sundry reports and publications into a single volume represents a Herculean effort. Even though the title implies the work deals only with cold injuries in foot soldiers, the book also describes such injuries in seamen and aircrew personnel. The authors' threefold purpose, namely, to record the history of cold injury in World War II, to summarize what has been learned of the nature of this form of trauma, and to formulate from the materials of the past history of cold injury the principles of a sound program for its control in future military operations, has been carried out to a remarkable degree.

Early in the book it was comforting to read that the basic pathology of the several types of cold injury is the same, and that the various names apply only to the physical conditions of cold exposure. This is an advanced concept that is not generally recognized. In discussing pathogenesis, it is regrettable that a few basic research studies published since World War II and some of the older German reports were not mentioned. These investigations dispute the idea, accepted by the authors, that cold injury is primarily vascular and that tissue damage results from prolonged vasoconstriction. The section on clinical manifestations contains excellent photographs. The discussion of therapy, both early and late, points up the lack of standard procedures during the war, and our general unpreparedness to care for these mass casualties. The chapter on epidemiology enlarges on a concept of cold injury, relatively unfamiliar to many, and represents a comprehensive and enlightening narration of the many factors which may or do have a bearing on the development of cold injury. This book fills a long-standing need for a single repository of material relating to a very important and difficult medical problem, primarily as it affects the military.—*ROBERT B. LEWIS, Col., USAF (MC)*

EMERGENCY WAR SURGERY, U. S. Armed Forces Issue of NATO Handbook, Prepared for Use by the Medical Services of NATO Nations, *United States Department of Defense.* Foreword by *Frank B. Berry,* M. D., Assistant Secretary of Defense (Health and Medical). 411 pages. United States Government Printing Office, Washington, D. C., 1958. Price $2.25.

This handsome, pocket-sized handbook, for the guidance of medical officers assigned to the management of individual and mass casualties of warfare, is divided into four major parts: "Types of Wounds and Injuries," "Response of the Body to Wounding," "General Consider-

ations of Wound Management," and "Regional Wounds and Injuries." The quality of the material presented is excellent. It is as up to date as the most current medical journal and, at the same time, contains the most carefully selected and worked over technics and doctrine developed in the two world wars and in Korea.

In any armed conflict, all medical officers in forward areas should have a personal copy of this handbook. As a result of the reviewer's personal experience with a similar Army technical bulletin in Korea, it is anticipated that this handbook would be one of the medical officer's most valuable possessions at the front. If possible, this reviewer suggests that the cover and text pages be made of water-resistant material, and also that anatomic drawings of surgical approaches to vessels be added to the glossary. War surgery taxes the ever-fading memory for anatomy as no other surgery can.

—*ROALD N. GRANT, Capt., MC, USN*

THE YEAR BOOK OF CANCER (1957-1958 Year Book Series), compiled and edited by *Randolph Lee Clark, Jr.*, B. S., M. D., M. Sc. (Surgery), D. Sc. (Hon.), and *Russell W. Cumley*, B. A., M. A., Ph. D. 523 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1958. Price $8.

The voluminous material published this year has been screened by an outstanding editorial board, and the use of the authors' own opinions in abstracting the articles has helped clarify their intent. Most of the literature being written about cancer is in the English language and the editors attribute this to the so-called "crash" program on cancer that is being developed in the United States. The articles, again, stress that although preoperative care, surgical technic, and postoperative care have shown improvement, the over-all cure rate of such malignancies as cancer of the pancreas, stomach, gallbladder, liver, and lungs has not improved in the past decade. Two features that again should impress the clinician are those of earlier diagnosis and preventive surgery on potentially malignant lesions until the vast expenditures on research find a better way to treat this disease. An interesting commentary on the progress of cancer research and treatment in Russia concludes this very interesting review.

—*SHAKEEB EDE, Capt., MC, USN*

FRACTURES AND OTHER INJURIES, by the Members of the Fracture Clinic of the Massachusetts General Hospital and of the Faculty of the Harvard Medical School, edited by *Edwin F. Cave*, M. D. Drawings by *Muriel McLatchie Miller*. Photography by *Donald Withee*. Editorial Board: *Joseph S. Barr*, M. D.; *Bradford Cannon*, M. D.; *Claude E. Welch*, M. D.; *James C. White*, M. D.; and *Edwin F. Cave*, M. D. 863 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1958. Price $28.

This book is a compendium of the material presented each fall at the Massachusetts General Hospital in a course entitled "Treatment of Fractures and Other Traumatic Conditions." The various chapters have been written by the large and distinguished faculty for this course, 39 contributors in all, with the former chief of the fracture service, Dr. Edwin Cave, as principal contributor and editor.

This is a straightforward volume that discusses each fracture or other traumatic condition in a simple, understandable manner. It preserves a nice balance between the operative treatment of fractures and the so-called "conservative" technics with an irreducible minimum of controversial material. The views expressed have been thoroughly tested in the 40 years that the fracture clinic has been in operation, and each author's views have been substantiated by an editorial board comprised of senior surgeons.

In addition to a discussion of the various fractures and their treatment, there is an interesting history of the fracture clinic of the Massachusetts General Hospital from its founding by Dr. Scudder in 1917 to the present, including an outline for the organization of a fracture service, a discussion of the metabolic effects of trauma, healing of fractures, bone grafting, craniocerebral injuries, et cetera. This is an ambitious undertaking in a volume of 863 pages, but the "meat" is here and it isn't abridged or dehydrated. Dr. Cannon's statement, in his chapter on facial injuries, that "it is not our purpose here to review all the methods that have been used in treating facial injuries but merely to report those that have proved simple and effective," sums up this volume better than any words by this reviewer. This aim has been accomplished in a brilliant manner.

The format is good, print is pleasant and easy to read, the binding is excellent, and reproductions of x-rays and drawings are outstanding. This book is heartily recommended to all physicians called upon to treat trauma. —*WILLIAM S. STRYKER, Capt., MC, USN*

ELECTRON MICROSCOPIC ATLAS OF NORMAL AND LEUKEMIC HUMAN BLOOD, by *Frank N. Low*, Ph. D., and *James A. Freeman*. 347 pages; illustrated. The Blakiston Division, McGraw-Hill Book Company, Inc., New York, N. Y., 1958. Price $25.

This atlas adds much to the study of the morphology of blood and, as there is no comparable book on this subject, it will be a source of reference for a long time in this developing field. To those who use the light microscope it adds to and strengthens the interpretations already accepted and will give stimulus to further work and better correlations. The volume consists of 236 micrographs. Fourteen of these were taken with the light microscope while the remainder were taken viewed through the electron microscope. The light photomicrographs are for comparison and to guide the reader into the forest of detail revealed by the electron microscope. The introduction is short and concise and provides enough information for a clear understanding of the purpose of the atlas, technics, and materials used. The entire atlas is well planned with full photographs on the right-hand page and a short clear description on the left page. Each photograph is clearly marked and labeled so that the description on the left page can be followed easily. It is not necessary to turn pages or rotate the atlas upside down or sideways to find the proper interpretation. The photographs are excellent and the descriptive terminology used is simple and clear. —*JOE M. BLUMBERG, Col., MC, USA*

DISEASES OF THE THYROID AND PARATHYROID GLANDS, by *Bernard J. Ficarra*, A. B., Sc. B., M. D., D. S. Foreword by *Arnold S. Jackson*, M. D. 295 pages; illustrated. Intercontinental Medical Book Corporation, New York, N. Y., 1958. Price $8.50.

This volume on disorders involving the thyroid and parathyroid glands is written by a surgeon and is of special interest for the general surgeon concerned with thyroid surgery. The greater portion of the book is concerned with hyperthyroidism in all its manifestations and with its treatment. The use of radioactive iodine, both as a diagnostic aid and as a therapeutic agent, is carefully reviewed. There is a discussion of the technical aspects of thyroid surgery. The chapter reviewing thyroid cancer constitutes a rapid review of the subject; parathyroid disease is rather briefly covered. The book is well written and illustrated and contains an excellent bibliography. This volume is recommended as a vehicle for office review of the subject of thyroid disease.—*JOHN E. GORMAN, Capt., MC, USN*

ALCOHOLISM, by *Arnold Z. Pfeffer*, M. D. Foreword by *S. C. Franco*, M. D., F. A. C. P. 98 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1958. Price $6.50.

This monograph is intended to serve physicians as a handbook for the management of alcoholic patients. It is especially aimed at the needs of the physician in industry where the occupational features of alcoholism are more easily seen. The volume presents an orientation to alcoholism as a disease, including definition, etiology, and a general discussion of complications, diagnosis, prognosis, and treatment. There are nine well-planned chapters and a total of 91 references. The adjunctive treatments and procedures for alcoholism, including the use of the newer tranquilizers, are quite adequately covered as are the psychological treatments and Alcoholics Anonymous. The Consolidated Edison-New York University-Bellevue Plan is discussed in detail. Programs for large and small companies, and additional sources of assistance to those interested in doing something about the problem of alcoholism in industry or elsewhere, are also presented. Some reasons for the relative success of the Consolidated Edison "company procedure on alcoholism" would appear to be not only the forthright acknowledgement of top management that the problem really exists, but also a well-defined company policy which forms the practical basis for administrative procedures to cover (1) early recognition, (2) rehabilitation, and (3) a consistent method for termination of employment when efforts to effect rehabilitation are unsuccessful. Their program involves a studied effort to uncover the alcoholic "hidden man" and to offer him necessary help along with the judicious application of company probation. I recommend this monograph as a "must have" not only for all members of the medical profession, but also for all those who are interested in the problem of alcoholism and what can be and is being done about it today.

—*PHILLIP B. SMITH, Lt. Col., MC, USA*

SCIENCE AND PSYCHOANALYSIS, Volume I, Integrative Studies, edited by *Jules H. Masserman,* M. D. 201 pages; illustrated. Grune & Stratton, New York, N. Y., 1958. Price $5.75.

This interesting book contains papers on the scientific aspects of psychoanalysis, as well as the transactions related to science and psychoanalysis of the newly formed Academy of Psychoanalysis. Among the contributors are such well-known names as David McK. Rioch, Roy A. Grinker, Abraham Kardiner, Kenneth E. Appel, Percival Bailey, and Sandor Rado. The thinking prevalent in this volume is an attempt to unify psychoanalysis with other sciences and, as may be expected at this early stage, the differences of opinion expressed are substantial. Some aspects of biological and anthropological psychoanalysis are discussed, and the whole problem of communication defects is presented in an interesting manner. Criteria and methods have been developed in recent years that have made possible a preliminary operational investigation of symbolic behavior through the use of data from studies on verbal behavior, anxiety, and on certain aspects of the phenomena generally included in the concept of the unconscious. On the other hand, it is noted that the superior capacity of the accultured human being for symbolic behavior adds to the difficulty of investigating human biology by operational methods. This is a book for the advanced student. Perhaps as more work is done on the subject the material will be available in a form suitable for wider dissemination. —*STEPHEN MOURAT, Lt. Col., MC, USA*

CLINICAL INTERPRETATION OF LABORATORY TESTS, by *Raymond H. Goodale,* M. D. 4th edition. 758 pages; 105 illustrations, 6 in color. F. A. Davis Co., Philadelphia, Pa., 1958. Price $8.75.

This book is divided into two parts. In the first part is a brief background of physiology, normal values, and the significance of abnormal values of the various body fluids. One may look up "sodium" and find the normal values in blood, a short dissertation on physiology, and listings of conditions in which the value is increased or decreased. The same may be done for chlorides and so on. Part two takes by disease the various systems with the associated laboratory findings. Reference may be made to a specific disease, for instance "Wilson's Disease." Under this heading a short description and listing of laboratory examinations with the findings is given. The presentations are brief, as one would expect, but references are available after each chapter. The index is a general one and is fairly complete. This book is recommended for the use of medical students, interns, and those practitioners who, by necessity, cover the wide field of medicine.

—*JOE M. BLUMBERG, Col., MC, USA*

PEDIATRIC SURGERY, by *Orvar Swenson,* M. D., F. A. C. S. Foreword by *William E. Ladd,* M. D. 750 pages; 980 illustrations. Appleton-Century-Crofts, Inc., New York, N. Y., 1958. Price $20.

This new textbook is an authoritative supplement to general surgical books dealing with adult surgery. It contains an adequate description of the differences between infant, child, and adult as to response to surgical procedures, problems of fluid and electrolyte therapy,

pre- and post-operative care, anesthesia technic and nursing. Minor surgical operations are described and illustrated in detail so as to be of practical value to the young general surgeon. The section on the use of antibiotics in children is particularly well written and up to date. The author is a pediatric surgeon of wide experience and an original contributor to the treatment of megacolon, megalo-ureter, and extrophy of the bladder. The section on Hirschsprung's disease is a masterly description of the etiology, radiographic diagnosis, indications for rectal biopsy, and surgical treatment, including fine illustrations and an adequate discussion of the complications and post-operative management. The surgical diseases of the thorax in children are well covered, particularly the treatment of staphylococcal pneumonia and its complications. The various anomalies and conditions of the abdominal viscera are adequately described. There is an excellent section on pediatric urology. There are many fine illustrations, clear diagrams describing operative procedures, good photographs and reproductions. Each section has a list of the important references covering the subject.

One cannot avoid comparing this book with the standard American reference on this subject: *The Surgery of Infancy and Childhood* by Robert E. Gross. Swenson's book compares favorably and this reviewer is of the opinion that both are necessary for a complete coverage of this growing specialty of surgery.

This book should be in the library of every surgeon who operates upon children and will also be of value to pediatricians and general practitioners. —*JOSEPH J. ZUSKA, Capt., MC, USN*

CLINICAL ORTHOPAEDICS. *Anthony F. DePalma,* Editor-in-Chief, with the assistance of the Associate Editors, the Board of Advisory Editors, and the Board of Corresponding Editors. No. 11, Spring 1958. 257 pages; illustrated. J. B. Lippincott Company, Philadelphia, Pa., 1958. Price $7.50.

This is the eleventh in an excellent series of bound journals offering, as in the past, a symposium on a specific subject, along with original monographs on a wide variety of orthopedic subjects. There are six concise articles dealing with various aspects of orthopedic surgery in the geriatric patient. Appraisal of the geriatric patient, anesthesia, fractures, and patellectomy in the aged are covered briefly but well. A chapter on the end-result study of vitallium cup arthroplasty of the hip is included in the section on geriatrics, but would seem to be more appropriately included in general orthopedics. In general, this symposium is well presented but leaves the reader with the feeling that the subject was covered only superficially. The second section, on general orthopedics, again places emphasis on clinical orthopedics. All articles are briefly and clearly presented. Included among these 17 chapters are: a new operation for correction of cavus foot; a new method of pelvic fixation; and, a startling new "shotgun" approach to the management of the frozen shoulder. The other authors contributing to this section offer less that is new, but perhaps more that

will stand the test of time. Section three entitled simply, "Items," includes nine chapters. Each chapter is clearly written about a variety of subjects generally from the standpoint of operative technic or new orthopedic equipment. The journal is beautifully illustrated by both photographs and diagrams. The table of contents is comprehensive and the index is complete. The orthopedic surgeon cannot afford to miss reading this outstanding journal. It is especially recommended for the orthopedic resident. —*CLIFFORD A. STEVENSON, Capt., MC, USN*

ACTION OF RADIATION ON TISSUES, An Introduction to Radiotherapy, by *A. Lacassagne* and *G. Gricouroff.* Translated by *Clarence C. Lushbaugh,* M. D., and *Gretchen R. Riese,* M. S. 199 pages; illustrated. Grune and Stratton, Inc., New York, N. Y., 1958. Price $6.25.

This excellent basic handbook of radiobiology is a translation by Clarence C. Lushbaugh, M. D., and Gretchen R. Riese, M. S., of the Los Alamos Scientific Laboratory, University of California. The original volume was written in 1939 and this second edition has been considerably revised. Included in this edition are the recent advances in radiobiology brought about by the atomic age. The American translators have added to the value of the book by including references to the significant works of American authors in addition to the extensive bibliography of the French and German authors.

The material is well indexed, and contains 17 figures of histopathologic materials. The effects of ionizing radiation are discussed in a well-organized and easily understood style. The chapter on total body irradiation has been expanded and there is included a discussion by the author of his views regarding carcinogenic effects and late sequelae. His conclusions of the effectiveness of irradiation in the treatment of cancer are basic, and should be understood by all entering or practicing the specialty of radiotherapy.

In view of the increasing interest in radiobiology and the rapid expansion of knowledge in this area, this book is a real contribution to the training program of all residents in radiology and radiobiology, and is an excellent reference source for further reading because of the extensive bibliography. —*SYLVESTER F. WILLIAMS, Capt., MC, USN*

CLINICAL OBSTETRICS AND GYNECOLOGY, Vol. 1, No. 2, June 1958. Toxemias of Pregnancy, edited by *Louis M. Hellman,* M. D. Fibromyomas of the Uterus, edited by *Robert A. Kimbrough,* M. D. 533 pages. Paul B. Hoeber, Inc., New York, N. Y. Price $7.50.

This book is number 2 of a new quarterly book series of Clinical Obstetrics and Gynecology, apparently devised to cover all major subjects of the specialty. The format is that of a symposium in which the authors present succinct dissertations on various phases of the two subjects covered in this number. It lacks the coherence and by-play of ideas and discussion usually found in a symposium, and the editors might well wrap it up at the end of each section by a short résumé of the thoughts expressed by the authors. The contributors to the section on toxemias of pregnancy are representative of the English-speaking world, while those to the section on fibromyomas

of the uterus are American only. In an enterprise of this sort, the views of the Swedes, Germans, French, Russian, Dutch, et cetera, would be welcome.

The index is adequate and cumulative, which is a very good idea from the standpoint of the occasional reader. Bibliographies are placed at the end of each article and are pertinent to the subject. A few errors in proof reading and make-up are found, particularly in the heading of the table of contents. Most of the subject matter is available in other sources and there is nothing really new. However, its being brought together may be of value to the general practitioner, intern, and resident. More hard-to-get material would make it attractive to specialists. A much more sophisticated publication is in order.

—ROY E. CROWDER, Capt., MC, USN

PERIODONTOLOGY, Clinical Pathology and Treatment of the Periodontal Tissues, by *Edgar D. Coolidge*, B. S., D. D. S., M. S., LL. D., and *Maynard D. Hine*, D. D. S., M. S. 3d edition, thoroughly revised. 440 pages; 463 illustrations on 268 figures and 2 color plates. Lea & Febiger, Philadelphia, Pa., 1958. Price $8.50.

This third edition has been slightly enlarged to include the more advanced technics in periodontal diagnosis and treatment. It is a carefully annotated edition giving proper credit to the pioneers in the development of periodontology. Of special value to the student, teacher, and others concerned with preventive dentistry is the chapter on prevention of dental disease. Material from many sources, as well as the authors' views, have been compiled into a carefully organized discussion.

The newer concepts of periodontal treatment have been described, but the section on periodontal technics is neither detailed nor instructive. The accompanying photographs are inadequate to illustrate either the procedures or the results to be expected. The book has a good index. This text would be of value to the student as an introduction to periodontology. *—NORMAN L. ESTERL, Capt., USAF (DC)*

PHYSICAL DIAGNOSIS, by *F. Dennette Adams*, M. D. 14th edition. 926 pages; illustrated. The Williams & Wilkins Company, Baltimore, Md., 1958. Price $12.

This new edition is well written and represents an invaluable text on this basic and important subject for both medical students and physicians. To read the chapters "Taking the history" and "Recording the physical examination" is appropriate regardless of one's position in medicine. The most helpful aspect of this book, to my view, is the integration of physical findings with other diagnostic procedures such as x-ray and electrocardiography. Disease entities of all the various systems of the body are thus presented in their diagnostic entirety. This makes for extremely easy reading and enhances retention of the material. The volume is highly recommended to the medical profession, young and old, regardless of specialty.

—JOHN B. MacGREGOR, Capt., MC, USN

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

PATHOPHYSIOLOGY IN SURGERY, by *James D. Hardy*, M. S., (Chem.), M. D., F. A. C. S. 704 pages; illustrated. The Williams & Wilkins Company, Baltimore, Md., 1958. Price $19.

HANDBOOK OF RESPIRATION. Analysis and Compilation by *Philip L. Altman, John F. Gibson, Jr.*, M. D., and *Charles C. Wang*. Edited by *Dorothy S. Dittmer* and *Rudolph M. Grebe*. Prepared under the direction of the Committee on the Handbook of Biological Data. Division of Biology and Agriculture, The National Academy of Sciences—The National Research Council, W. B. Saunders Company, Philadelphia, Pa., 1958.

RADIOACTIVE ISOTOPES IN CLINICAL PRACTICE, by *Edith H. Quimby*, Sc. D.; *Sergei Feitelberg*, M. D.; and *Solomon Silver*, M. D. 451 pages; illustrated. Lea & Febiger, Philadelphia, Pa., 1958. Price $10.

YEAR BOOK OF MEDICINE, 1958-1959 Series, edited by *Paul B. Beeson*, M. D.; *Carl Muschenheim*, M. D.; *William B. Castle*, M. D.; *Tinsley R. Harrison*, M. D.; *Franz J. Ingelfinger*, M. D.; and *Philip K. Bondy*, M. D. 782 pages; illustrated. The Year Book Publishers, Inc., Chicago Ill., 1958. Price $7.50.

PROGRESS IN RADIATION THERAPY, edited by *Franz Buschke*, M. D. 284 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1958. Price $9.75.

PICTORIAL HANDBOOK OF FRACTURE TREATMENT, by *Edward L. Compere*, M. D., F. A. C. S.; *Sam W. Banks*, M. D., F. A. C. S.; *Clinton L. Compere*, M. D., F. A. C. S. 4th edition. 448 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1958. Price $7.50.

PHYSIOLOGICAL BASES OF PSYCHIATRY, compiled and edited by *W. Horsley Gantt*, M. D. 344 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $10.50.

TUMORS AND TUMOROUS CONDITIONS OF THE BONES AND JOINTS, by *Henry L. Jaffe*, M. D. 629 pages; 701 illustrations on 194 figures. Lea & Febiger, Philadelphia, Pa., 1958. Price $18.50.

SEX AND THE ADOLESCENT, by *Maxine Davis*. Foreword by *J. Roswell Gallagher*, M. D. 317 pages. The Dial Press, New York, N. Y., 1958. Price $5.

AGGRESSION, by *John Paul Scott*, Senior Staff Scientist, Roscoe B. Jackson Memorial Laboratory. 149 pages; illustrated. The University of Chicago Press, Chicago, Ill., 1958. Price $3.75.

THE COMPARATIVE MORPHOLOGY OF THE CAROTID BODY AND CAROTID SINUS, by *William Edgar Adams*, D. Sc., Ph. D., B. Med Sc., M. B., Ch. B., F. A. Z. 272 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1958. Price $10.50.

CEREBRAL VASCULAR DISEASES. Transactions of the Second Conference Held under the Auspices of the *American Heart Association,* Princeton, N. J., January 16-18, 1957. *Irving S. Wright,* Chairman; *Clark H. Millikan,* Editor. Including a Classification and Outline of Cerebrovascular Diseases. 224 pages. Published for The American Heart Association by Grune & Stratton, Inc., New York, N. Y., 1958. Price $4.

BRITISH MEDICAL BULLETIN, Volume XI, Number 5, September 1958, "Ophthalmic Literature for 1957," edited by Sir *Stewart Duke-Elder,* G. C. V. O. Contents: Abstracts from current literature. 562 pages. Published by The British Medical Association, Tavistock Square, London, W. C. 1. Issued Quarterly. Price: Annual Subscription, Four Guineas, post free. $13.50.

BRITISH MEDICAL BULLETIN, Volume XII, Number 1, September 1958, "Ophthalmic Literature for 1958," edited by Sir *Stewart Duke-Elder,* G. C. V. O. Contents: Abstracts from current literature. 575 pages. Published by The British Medical Association, Tavistock Square, London, W. C. 1. Issued Quarterly. Price: Annual Subscription, Four Guineas, post free. $13.50.

POISONING, A Guide to Clinical Diagnosis and Treatment, by *W. F. von Oettingen,* M. D., Ph. D. 2d edition. 627 pages. W. B. Saunders Company, Philadelphia, Pa., 1958.

TECHNIC AND PRACTICE OF PSYCHOANALYSIS, by *Leon J. Saul,* M. D. 244 pages. J. B. Lippincott Company, Philadelphia, Pa., 1958. Price $8.

ESSENTIALS OF PEDIATRICS, by *Philip C. Jeans,* A. B., M. D.; *F. Howell Wright,* B. S., M. D.; and *Florence G. Blake,* R. N., M. A. 6th edition. 714 pages; illustrated. J. B. Lippincott Company, Philadelphia, Pa., 1958. Price $6.

UROLOGY IN GENERAL PRACTICE, by *Frank Coleman Hamm,* M. D., M. S., F. A. C. S., and *Sidney R. Weinberg,* M. D., F. A. C. S. 293 pages; illustrated. J. B. Lippincott Company, Philadelphia, Pa., 1958. Price $6.

THE PHYSICAL TREATMENT OF VARICOSE ULCERS. A Practical Manual for the Physiotherapist and Nurse, by *R. Rowden Foote,* F. I. C. S., M. R. C. S., L. R. C. P., D. R. C. O. G., with a section on Electrical Adjuncts to Treatment, by *T. Wareham,* M. C. S. P. 125 pages; illustrated. The Williams & Wilkins Company, Baltimore, Md., 1958. Price $4.

MONOGRAPHS ON NEOPLASTIC DISEASE AT VARIOUS SITES. General Editor: *D. W. Smithers,* M. D., F. R. C. P., F. F. R. Volume 1, CARCINOMA OF THE LUNG, edited by *J. R. Bignall,* M. D., M. R. C. P. 298 pages; illustrated. The Williams & Wilkins Company, Baltimore, Md., 1958. Price $10.50.

YOUR CHILD'S WORLD, by *Robert Odenwald,* M. D. 211 pages. Random House, Inc., New York, N. Y., 1958. Price $3.50.

INCREASING PHARMACY PROFITS, by *Frank T. James.* 148 pages. J. B. Lippincott Company, Philadelphia, Pa., 1958. Price $4.75.

BACTERIAL AND MYCOTIC INFECTIONS OF MAN, edited by *Rene J. Dubos,* Ph. D., The Rockefeller Institute. With 36 contributors. 3d edition. 820 pages; illustrated. J. B. Lippincott Company, Philadelphia, Pa., 1958. Price $8.50.

BASIC CLINICAL PARASITOLOGY, by *David L. Belding,* M. D. 469 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y., 1958.

GUIDE TO RUSSIAN MEDICAL LITERATURE. Editors: *Scott Adams*, National Institutes of Health, and *Frank B. Rogers*, M. D., National Library of Medicine. 89 pages. Public Health Service Publication No. 602. U. S. Department of Health, Education, and Welfare, Public Health Service, Washington, D. C., 1958. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

TUMORS OF THE ORAL REGIONS, edited by *Hamilton B. G. Robinson*, D. D. S., M. S. 143 pages; illustrated. W. B. Saunders Company, Philadelphia, Pa., 1958.

THORAX, Volume 13, No. 3, September 1958, edited for The Thoracic Society (President, P. R. Allison), by *N. R. Barrett* and *J. G. Scadding*. 173-250 pages; illustrated. Published by British Medical Association, Tavistock Square, London W. C. 1, England. Price $10.00 yearly subscription (4 numbers); single numbers $2.50.

SCHIZOPHRENIA, by *Manfred Sakel*, M. D., with a foreword by Professor *Hans Hoff*, Head, Department of Neurology & Psychiatry, University of Vienna. 335 pages. Philosophical Library, Inc., New York, N. Y., 1958. Price $5.

PSYCHOLOGICAL STRESS, by *Irving L. Janis*, Ph. D. 439 pages. John Wiley & Sons, Inc., New York, N. Y., 1958. Price $6.95.

DIAGNOSTIC BACTERIOLOGY, by *Isabelle G. Schaub*, A. B.; *M. Kathleen Foley*, M. A.; *Elvyn G. Scott*, M. T. (ASCP); and *W. Robert Bailey*, Ph. D. 5th edition. 338 pages; illustrated. The C. V. Mosby Company, St. Louis, Mo., 1958. Price $4.75.

KNOW YOUR DOCTOR, by *Paul E. Craig*, M. D. 179 pages. Exposition Press, New York, N. Y., 1958. Price $3.50.

INJURIES AND SURGICAL DISEASES OF THE ISCHIUM, by *Henry Milch*, M. D. 163 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1958. Price $10.50.

CIBA FOUNDATION COLLOQUIA ON AGEING, Volume 4 - Water and Electrolyte Metabolism in Relation to Age and Sex. Editors for the Ciba Foundation: *G. E. W. Wolstenholme*, O. B. E., M. A., M. B., B. Ch., and *Maeve O'Connor*, B. A. 327 pages; with 85 illustrations. Little, Brown and Company, Boston, Mass., 1958. Price $8.50.

CIBA FOUNDATION SYMPOSIUM - on the Neurological Basis of Behavior. In commemoration of Sir Charles Sherrington, O. M., G. B. E., F. R. S., 1857-1952. Editors for the Ciba Foundation: *G. E. W. Wolstenholme*, O. B. E., M. A., M. B., B. Ch., and *Cecilia M. O'Connor*, B. Sc. 400 pages; with 109 illustrations. Little, Brown and Company, Boston, Mass., 1958. Price $9.

A BIBLIOGRAPHY OF INTERNAL MEDICINE - COMMUNICABLE DISEASES, by *Arthur L. Bloomfield*, M. D. 560 pages. The University of Chicago Press, Chicago, Ill., 1958. Price $10.

THE MANAGEMENT OF EMERGENCIES IN THORACIC SURGERY, by *John Borrie*, M. B. E., Ch. M., F. R. C. S. (Eng.), F. R. A. C. S. Foreword by Sir *Russell Brock*. 340 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y. Price $10.

EYE SURGERY, by *H. B. Stallard*, M. B. E., M. A., M. D. (Cantab.), F. R. C. S. (Eng.), Hon. LL. D. (St. Andrews). 3d edition, revised. 899 pages; 671 illustrations. The Williams & Wilkins Company Ltd., Baltimore, Md., 1958. Price $18.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 71, Art. 6, pages 807-1241, September 30, 1958. Editor in Chief, *Otto V. St. Whitelock.* "Genetic Concept for the Origin of Cancer." Consulting Editor, *Leonell C. Strong.* 434 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1958.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 72, Article 6, pages 227-238, 29 August 1958. Editor in Chief, *Otto V. St. Whitelock.* "The Influence of Sulfhydryl Groups and Their Inhibitors on the Distribution of Radiocobalt in the Organs and Intracellular Organelles of the Mouse," by *Laurence S. Maynard.* New York Academy of Sciences, New York, N. Y., 1958.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 73, Article 1, pages 1-380, 5 September 1958. Editor in Chief, *Otto V. St. Whitelock.* "Hodgkin's Disease." Consulting Editor, *Antonio Rottino.* 380 pages; illustrated. New York Academy of Sciences, New York, N. Y., 1958.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 73, Article 2, pages 381-538, 10 September 1958. Editor in Chief, *Otto V. St. Whitelock.* "Surgical Convalescence." Consulting Editor, *F. Curtis Dohan.* 157 pages; illustrated. New York Academy of Sciences, New York, N. Y., 1958.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 73, Article 4, pages 869-910, September 30, 1958. Editor-in-Chief, *Otto V. St. Whitelock.* Managing Editor, *Franklin N. Furness.* Associate Editor, *Peter A. Sturgeon.* "Basic Biodynamics," by *Edward J. Kempf,* Psychobiologist. The New York Academy of Sciences, New York, N. Y., 1958.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 74, Article 1, pages 1-160, September 30, 1958. Editor-in-Chief, *Otto V. St. Whitelock.* Managing Editor, *Franklin N. Furness.* Associate Editor, *Francis S. Stahl.* "Contributions of the Physical, Biological, and Psychological Sciences in Human Disability." Consulting Editor, *Renato Contini.* The New York Academy of Sciences, New York, N. Y., 1958.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 76, Article 1, pages 1-16, 15 September 1958. Editor in Chief, *Otto V. St. Whitelock.* "A Periodic Table for Fundamental Particles," by *John J. Grebe.* 16 pages; illustrated. New York Academy of Sciences, New York, N. Y., 1958.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 76, Article 2, pages 17-408, September 30, 1958. Editor-in-Chief, *Otto V. St. Whitelock.* Managing Editor, *Franklin N. Furness.* Associate Editor, *Francis S. Stahl.* "The Basic and Clinical Research of the New Antibiotic, Kanamycin." Consulting Editor, *Maxwell Finland.* The New York Academy of Sciences, New York, N. Y., 1958.

REHABILITATION MEDICINE. A Textbook on Physical Medicine and Rehabilitation, by *Howard A. Rusk,* M. D., and *36 collaborators,* with the editorial assistance of *Eugene J. Taylor,* A. M. 572 pages; illustrated. The C. V. Mosby Company, St. Louis, Mo., 1958. Price $12.

AUTOPSY DIAGNOSIS AND TECHNIC, by *Otto Saphir,* M. D. Foreword by *Ludvig Hektoen,* M. D. 4th edition. 549 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1958. Price $8.50.

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